



National Library
of Canada

Bibliothèque nationale
du Canada

Canadian Theses Service

Service des thèses canadiennes

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microform is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this microform is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30.

AVIS

La qualité de cette microforme dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, tests publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de cette microforme est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30.

THE UNIVERSITY OF ALBERTA
HYPNOTHERAPEUTIC REDUCTIONS OF DENTAL PATIENT'S DISTRESS

BY

(C) ROBERT PHILIP HAINES

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

IN

COUNSELLING PSYCHOLOGY

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

FALL, 1988

Permission has been granted to the National Library of Canada to microfilm this thesis and to lend or sell copies of the film.

The author (copyright owner) has reserved other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without his/her written permission.

L'autorisation a été accordée à la Bibliothèque nationale du Canada de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur (titulaire du droit d'auteur) se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation écrite.

ISBN 0-315-45661-2

THE UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: ROBERT PHILIP HAINES
TITLE OF THESIS: HYPNOTHERAPEUTIC REDUCTIONS OF DENTAL PATIENTS' DISTRESS
DEGREE: DOCTOR OF PHILOSOPHY
YEAR THIS DEGREE GRANTED: 1988

Permission is hereby granted to THE UNIVERSITY OF ALBERTA LIBRARY to reproduce single copies of this thesis and to lend or sell such copies for private, scholarly or scientific research purposes only.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

Robert Philip Haines

16 Feero Drive

Whitecourt, Alberta

T0E 2L0

DATE: July 29, 1988

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and
recommend to the Faculty of Graduate Studies and Research
for acceptance, a thesis entitled Hypnotherapeutic Reductions
of Dental Patients' Distress submitted by Robert Philip Haines
in partial fulfilment of the requirements for the degree
of Doctor of Philosophy
in Counselling Psychology

Tutu Balder
Supervisor

J. Bulsony
Dr. J. Simmons
J. Thomas
J. R. Haines

Date: June 23, 1988

Dedication

This work is dedicated to the memory of my father-in-law, Mr. George J. Meko who gave me endless encouragement and who always expressed a desire to be here for the completion of this thesis. Thank-you George. You're still very much with us.

ABSTRACT

One hundred dental patients participated in an experiment designed to compare directly and indirectly worded styles of hypnotherapy delivered either in-person or via audio-tape. The hypnotherapy treatments were applied as preparation for dental treatment, to prevent patient's anxiety and pain distress. An equal number of adult men and women were randomly assigned to 5 groups, indirect-taped, direct-live, indirect-live, and direct-live and no-treatment control conditions. The comparative effects of four experimental conditions and a control were measured on 14 indices of distress including anxiety and pain measures. It was hypothesized that those in the hypnotherapy treatment groups would show less dental treatment related distress than those in the no-treatment control group, and that live and indirect conditions would produce the most impactful distress reductions.

Results supported the hypotheses. Multivariate statistical tests showed a general effectiveness of hypnotherapy treatments, compared with control conditions, on the distress measures. Univariate analyses revealed that the distress reductions were mainly on the anxiety and fear scales and measures, and less on pain measures. More widespread effects were produced by the indirect than the direct conditions, and indirectly worded hypnotherapy was especially effective when delivered in-person. Participants rated the direct hypnotherapy approaches to be more forced or pushy than the indirect approaches, and those in the direct groups were less likely to indicate that they would like the preparatory treatment again. No significant differences were detected between groups on the estimated levels of trance produced by the procedures. Patients' ratings of their enjoyment of the hypnotic procedures were generally high, with no differences detected between groups.

Although the indirect and live conditions were found to be more effective than direct and taped conditions, it was concluded that further enhancement might have been achieved given more elaborate analgesic suggestions, and more frequent post-hypnotic cues. Implications for applying a program of assessment and brief intervention were discussed.

Acknowledgements

This project required the devotion and thoughtfulness of many people. My gratitude to Dr. Calder for his expert research knowledge, guidance and supervision. Similarly I am grateful to the rest of my supervisory committee, Dr. Thomas from Dentistry and Dr. Boersma from Educational Psychology. As well, thanks to Dr. Fitzsimmons who provided valuable comments during the candidacy and oral exams, and to Dr. Paulson from Student Counselling and Dr. Stewin, also for their involvement in the candidacy.

Without the hard work and patience of my brother, Dr. Ron Haines, and his staff, this project would likely not have been completed. Their dedication to patient comfort rivals the best that exists in counselling. Thanks to the more than 100 dental patients in who gave their valuable time and consideration to agree to participate in the experiment, to Dr. Irving for her participation and to Dr. Mercer for providing a brief opportunity to work with Whitecourt dental patients.

I also owe appreciation to the head office, particularly research, staff of Mental Health Services in Edmonton for allowing me to use their computer for data analysis. Thanks to Dr. Gus Thomson and his staff.

Naturally our family came first ensuring my security, providing that love and life force that makes all neverending tasks bearable. Thank-you Shanly and Chelsea for you endurance.

TABLE OF CONTENTS

CHAPTER	PAGE
I INTRODUCTION.....	1
Hypnotherapy and Dental Distress.....	3
Purpose of the Experiment.....	4
Method of Experiment.....	6
II LITERATURE REVIEW.....	8
Epidemiology of Dental Distress.....	8
Prevalence of Dental Fear.....	8
Measurements of Dental Fear.....	10
Correlates of Dental Fear.....	12
Causes of Dental Anxiety.....	13
Pain.....	13
Early Experience.....	15
The Dentist.....	16
Psychopathology.....	17
Waiting Time.....	18
The Treatment of Dental Distress.....	18
Pharmacological Agents and Methods.....	18
Sedatives and Anxiolytics.....	18
Premedication.....	19
Local Anesthesia.....	22
General Anesthesia.....	23
Conclusions.....	23
Non-intrusive Treatments of Dental Distress.....	24
Dentist-Patient Relationships.....	24
Early Exposure.....	27
Modeling.....	27
Behavior Modification.....	29
Systematic Desensitization.....	30
Relaxation Training.....	32
Cognitive-Behavior Therapy.....	34
Hypnosis.....	36
Direct and Indirect Hypnotherapy Approaches.....	42
Taped and Live Hypnotic Presentations.....	47
Unusual Hypnotic Procedures.....	49
Conclusions.....	49
Hypotheses.....	50
III METHOD.....	52
Design.....	52
Participants.....	52
Assessment Measures.....	53
Self-report Measures.....	53
Dental Personnel Ratings.....	54
Physiological measure.....	54
Additional measure.....	55
Procedure.....	56
Pilot Study.....	57
Analyses.....	60
IV RESULTS AND DISCUSSION.....	64
Description of Participants.....	64
Hypnotherapy Treatment Main Effects.....	65
Covariates.....	70
Covariance Analyses.....	71

Conclusions of Main Effects Utilizing MANOVA and ANOVA Tests of Significance With and Without Covariates.....	72
Combined Group Analyses.....	73
Combined taped-presentation groups and combined live-presentation groups compared with controls.....	73
Combined direct-style hypnotherapy groups and combined indirect-style hypnotherapy groups compared with controls.....	75
Correlational Analyses.....	76
Abbreviation Meanings.....	78
Effects of Gender.....	82
Participants' Perceptions of Forcefulness of Direct versus Indirect Intervention.....	84
Effect of Hypnotherapy Procedure on Whether Participant Would Like The Preparation Again in Future.....	85
Level of Trance.....	86
Participants Ratings of Level of Enjoyment of the Hypnotherapy Treatment.....	86
Participant's Comments.....	87
Discussion.....	87
Comparisons of the Five Groups with Multivariate and Univariate Analyses.....	87
Methodological Considerations of the Five Group Comparison.....	91
Statistical Concerns With the Five Group Comparison.....	91
Covariance Analyses.....	92
Comparisons of Two Combined Groups and The Control Group With Multivariate and Univariate Analyses.....	93
Combined Taped and Combined Live presentation groups compared with the control group.....	93
Combined Direct and Combined Indirect Presentation Groups Compared With the Control Group.....	93
Enjoyment, Forcefulness, Levels of Trance, and Intervention Preferences.....	96
Limitations of the Experiment.....	96
V SUMMARY, CONCLUSIONS, AND IMPLICATIONS.....	98
Summary.....	98
Conclusions.....	102
Implications.....	103
Implications For Dentistry.....	103
Implications for Hypnosis Practice and Theory.....	105
Implications for The Use of Hypnosis in Other Distress Settings.....	106
Suggestions for Future Research.....	107
BIBLIOGRAPHY.....	109
APPENDIX I	
Introductions.....	126
APPENDIX II	
Consent Form.....	127
APPENDIX III	
The CDAS.....	128
APPENDIX IV	
Dental History Questionnaire.....	129
APPENDIX V	
Chi-Square Statistics on Dental History Questions.....	130
APPENDIX VI	
Summary and ANOVA Statistics on Pre-Experimental Measures.....	131
APPENDIX VI(CONTINUED).....	132
APPENDIX VII	
Dentist's Questionnaire and Rating Scale.....	133
APPENDIX VIII	
Dental Assistant's Rating Scale.....	134
APPENDIX IX	
Patient's Rating Scale.....	135

APPENDIX X	
Dental Fear Survey	136
APPENDIX XI	
MANCOVA Summary	137
APPENDIX XII	
ANCOVA Summaries	138
APPENDIX XIII	
Direct Induction	139
APPENDIX XIV	
Indirect Induction	144
APPENDIX XV	
Summary of Participant's Dentist's and Dental Assistant's Comments	150

LIST OF TABLES

TABLE		PAGE
1	Summary of "YES" and "NO" Responses, Chi-Squares, and Significance Levels of Four Dental History Questions of the Five Groups (In Appendix V)	130
2	Summary of Means, Standard Deviations, Minimums and Maximums of Age by Group (In Appendix VI)	131
3	Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Age at First Dental Visit by Group (In Appendix VI)	131
4	Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Time Since Last Visit by Group (In Appendix VI)	131
5	Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Pre-Treatment CDAS Scores by Group (In Appendix VI)	132
6	Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Trait Anxiety (STAI) by Group (In Appendix VI)	132
7	Logs of Determinants from Within-Groups Error Sources	65
8	Group Effect: Multivariate Tests of Significance	66
9	Summary of Univariate Analyses of Variance on 14 Dependent Variables	66
10a	Summary of Means and Standard Deviations of the Post-CDAS Measure of Each Group	67
10b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Post -CDAS Scores	67
11a	Summary of Means and Standard Deviations of the Dental Fear Survey, Avoidance Measure of Each Group	67
11b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Avoidance Measure	67
12a	Summary of Means and Standard Deviations of the Dental Fear Survey, Physical Measure of Each Group	68
12b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey Physical Measure	68
13a	Summary of Means and Standard Deviations of the Dental Fear Survey, Fear Question Measure of Each Group	68
13b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Fear Question	68
14a	Summary of Means and Standard Deviations of the Dental Fear Survey, Cognitive Measure of Each Group	69
14b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Cognitive Measure	69
15a	Summary of Means and Standard Deviations of the Dentist's Ratings of Comfort Measure of Each Group	69
15b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dentist's Ratings of Comfort	70
16a	Summary of Means and Standard Deviations of the GSR Difference Measure of Each Group	70
16b	Summary of Contrasts (t-tests) of Control Group with Treatment Groups on GSR Difference Measure	70
17	Group Effects: Multivariate Tests of Significance with Appointment Time as a Covariate	137
18	Summary of Univariate Analyses of Covariance on 14 Dependent Variables With Appointment Time as a Covariate	138
19	ANOVA's, Probabilities, and Significant Contrasts of Seven Significant Variables	72
20	Group Effect: Multivariate Tests of Significance on Combined Presentation Modes' Groups and Control Group With Appointment Time and Dentist's Ratings of Intensity as Covariates	73
21	Summary of Univariate Analyses of Covariance on 14 Dependent Variables	

22	With Appointment Time and Dentist's Ratings of Intensity as Covariates ANOVA's, Probabilities, and Significant Contrasts of Eight Significant Variables	74 74
23	Group Effect: Multivariate Tests of Significance on Combined Direct, Indirect and Control Groups With Appointment Time and Dentist's Ratings of Intensity as Covariates	75
24	Summary of Univariate Analyses of Covariance on 14 Dependent Variables With Appointment Time and Dentist's Ratings of Intensity as Covariates: Direct, Indirect, and Control Groups	76
25	ANOVA's, Probabilities, and Significant Contrasts of Nine Significant Variables	76
26 a-d	Pearson Correlation Coefficients of all Variables	77-80
27	Summary of Means and Analysis of Variance of Dental Fear Survey Avoidance scores by Group and Sex	82
28	Summary of Means and Analysis of Variance of Dental Fear Survey Physical scores by Group and Sex	83
29	Summary of Means and Analysis of Variance of Dental Fear Survey Cognitive scores by Group and Sex	83
30	Summary of Means and Analysis of Variance of Dental Fear Survey Fear Question Scores by Group and Sex	84
31	Summary of Frequencies of Yes and No and Chi Square Analysis of Responses to Question of Receiving Preparatory Intervention Again: Indirect versus Direct Groups	85
32	Summary of Frequencies of Yes and No and Chi Square Analysis of Responses to Question of Receiving Preparatory Intervention Again : Live versus Taped Groups	85
33	Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Level of Enjoyment by Hypnotherapy Group	86
34	Summary of Means and Standard Deviations on Measure of Dental Assistants' Ratings of Participants' Pain Intensity: Rated on 10-point scales	89
35	Summary of Means and Standard Deviations on Measure of Dentists' Ratings of Participants' Pain Intensity: Rated on 10-point scales	90
36	Summary of Means and Standard Deviations on Measure of Patients' Ratings of Their Own Pain Intensity: Rated on 10-point scales	90

I INTRODUCTION

Everyone has experienced distress, our unpleasant and sometimes harmful perceptions and reactions to demands placed on the body (Selye, 1974). The dentist's office is one environment where people predictably experience excessive distress in the form of pain and anxiety. Scott, Hirschman, and Schroder (1984) have estimated the proportion of dental patients who experience anxiety about dental treatment to be near 80%. That pain is also implicated as a concern of dental patients and dentists is evidenced by the fact that each day some 2 million anesthetic injections are given in dental operatories throughout the world (Fiset, Milgram, Weinstein, Getz, and Glassman, 1985). Proof of the intensity of the distress perceived by dental patients was documented by Agras, Sylvester, and Oliveau (1969) who found that fear of dental treatment was given a fifth place ranking out of 40 of the most frequently reported common fears. From their survey, fear of dentistry was ranked just ahead of fears of illness and injury, and equal to fear of flying. According to Malamed (1985) fear of pain is people's primary fear.

Most people have learned to accept some fear and pain, although our tolerances are highly variable and idiosyncratic (Joy and Barber, 1977). We have learned, more or less, to adapt by fighting, concealing, or coping with fear and pain suffering. For those most fortunate, the experiences are usually brief and shallow, whereas others must endure the terrors of phobic anxiety or throes of piercing, relentless pain.

Theoretical and practical psychologies have always regarded the extreme forms of such suffering as preeminent challenges, to explain and alleviate. As a topic *anxiety* has always been central to students of theoretical psychology and psychotherapy. *Pain* is probably the most frequently expressed clinical complaint in domains of health care, and increasingly, a concern for psychotherapists. There is sufficient reason in the area of dentistry alone to justify the creation of new treatments for fear and pain distress. Dental distress contributes to myriad problems for patients and dentists; poor oral health, dentist's and patient's stress, financial cost, and the frequent demands for potent anesthetic, analgesic, and sedative medications have been

consequences of excessive anxiety and pain. Yet the study of psychological treatments extends beyond dental clinics. Treatments developed for dental patients can be applied with others who undergo invasive medical treatments or suffer the fear and pain that accompanies injury and disease.

Concerns with the self-limiting effects of anxiety and phobias have always been prime foci of psychotherapy. With more knowledge about the impact of these forms of distress to serious illness, and further understanding of the interactions of fear with pain, more lines of research and treatment have developed into medical areas (Hilgard and Hilgard, 1983). Particular problems of human suffering traditionally saved for physicians and health care professionals are now being addressed by psychologists. Concurrently, concerns with the adverse effects of pharmacological treatments has inspired a search for less intrusive methods with which to ameliorate disorders where fear and pain are ubiquitous (Foreman, 1984).

There are additional benefits from studying and developing treatments for fear and pain in the dental clinic. Nowhere have there been more convenient locations to research human distress than in dental treatment settings (Malamed, 1979). Fear and pain occur predictably and resemble the distress experienced by patients in other health care environments. Furthermore, the population of dental patients represents a full continuum of fear, from the mildly apprehensive, to the anxious, to the phobic. Patients' visits to the dentist provide a view of complete, although relatively short, episodes of experiences of distress, possibly involving phases of anticipation, tolerance, and coping. According to Malamed (1979) in relation to the fear of dental treatment, "There is no reason to believe that the results [of studies applying psychological treatments] would not generalize to other types of problems involving anticipatory anxiety and avoidance behaviors, such as fear of flying, public speaking, school phobia, and agoraphobia." (p. 201)

Hypnotherapy and Dental Distress

A treatment area that has been found progressively more effective for disorders involving fear and pain is hypnotherapy. A general resurgence of interest and psychotherapy treatment activity involving hypnosis has been evidenced in the past 15 years and the role of hypnotherapy is expanding into new territory, including behavior therapy (Clarke & Jackson, 1983). Although the earliest reports of hypnotherapeutic applications to dentistry were documented in the mid-1800's, hypnotherapy has gained most extensive popularity with dentists since the second world war (Hilgaard and Hilgaard, 1983). From that time two general streams of hypnotherapy evolved. One approach advocated a general strategy of induction for everyone to be treated. Individual preferences, language, and reactions were disregarded in favor of standard procedures that could be consistently applied, the same way to all individuals. The usual finding using this approach has been variability in responsiveness to standardized inductions; some individuals have shown more responsiveness than others. Then the assumption was made that hypnosis susceptibility is variable in the population and fairly stable in individuals. Extending this rationale, advocates of this position have argued that only a small percentage of people are easily hypnotizable, and most are mildly or moderately hypnotizable (Kihlstrom, 1985). Consequently, several hypnotic suggestibility scales have been developed for use with standardized inductions and the assumption was made that only those most fortunate are highly hypnotizable and can benefit from hypnotherapy. Others (eg J. Barber, 1977) have been less accepting of this position. Disadvantages of standardized scales of suggestibility for use in clinical work and research have been that they: usually require hours to administer, can interfere with treatment by setting expectations about what hypnosis ought to be, and clinical versions have low reliabilities. An alternative approach to hypnotherapy, represented mainly by Milton H. Erickson, has developed with the premise that hypnotic inductions may be more indirect and naturalistic, with

individualized, permissive language, and sensitivity to the ongoing reactions of hypnotic subjects. With *Ericksonian* hypnotherapy clients are guided rather than directed to hypnotic experiences. An assumption of this approach is that almost anyone can reach at least a mild state of hypnosis and suggestibility.

Both approaches have been applied to reduce patient's distress during dental treatment. With a more naturalistic method of induction, J. Barber (1976; 1977) reported remarkable experimental and clinical results, producing analgesia in almost all the dental patients he saw, regardless of the type of dental treatment, or degree of hypnotizability or suggestibility. Subsequently there were claims that Barber's (1977) results could not be replicated (Gillet & Coe, 1984; VanGorp, Meyer, & Dunbar, 1985). However, the attempted replications included naturalistic inductions that were given by audio-tape recorder, rather than in-person, as some consider essential for an individualized hypnotic induction. In one study where inductions and indirect suggestions were delivered in-person, Friction and Roth (1985) reported success in producing analgesia regardless of susceptibility levels of the subjects. Although this lent support to Barber's (1977) results and the Rapid Induction Analgesia (RIA) method, Friction and Roth's (1985) subjects were subjected to experimentally produced oral pain rather than actual dental treatment pain. One of the primary problems addressed by the current research was the need for a reexamination, in a clinical setting, of the comparative effectiveness of a more permissive, indirect approach with a more authoritative direct approach.

Purpose of the Experiment

The present experiment was intended to compare an indirect induction and suggestion form of hypnotherapy with a more direct and standardized method of hypnotherapy for reducing the distress and improving the comfort of dental patients during treatment. The hypnotherapeutic treatments varied in (a) degree of directness in the provision of inductions and suggestions, and (b) their mode of delivery (taped versus live). The main questions considered were (1) Are the hypnotherapy procedures effective in reducing anxiety and pain of patients undergoing dental

treatment?, (2) Are indirect-induction and suggestion methods more effective than direct induction/suggestion hypnotherapy methods?, (3) Are taped hypnotherapy presentations as effective as live presentations?, (4) What are the relationships among variables like pretreatment anxiety levels and early experiences and traumas with dental treatment, pain and fear, dental anxiety and trait anxiety?

The first question was related to the general effectiveness of all hypnotherapy treatments compared to the control condition, as there has been reported a paucity of group outcome experiments in that literature. The question was, in part, a response to a challenge made by Friction and Roth (1985). Following their study showing the advantages of indirect-induction hypnosis, they stated, "With further research, hypnotic induction techniques can be further refined to have increasing effectiveness and efficiency regardless of individual differences in susceptibility and characteristics of the clinical situations." (p. 231)

The second question related to recent theoretical directions of hypnotherapy. On the one hand there have been theorists, like Kihlstrom (1985) who have maintained that there are differing levels of hypnotic suggestibility. Consistent with this view, Crasilneck and Hall (1985) and others have argued that those more hypnotizable patients, who can reach "deeper" levels of hypnosis are those who have responded well to analgesia suggestions. On the other hand, there are researchers, like J. Barber (1977) and others who subscribe more to Ericksonian views of hypnotherapy and who have argued that most people can reach effective levels of hypnosis given the induction and suggestions are provided in a more individualized fashion, with permissive language and timing of delivery of suggestions, consistent with the patient's reactions such as breathing rates, and responses to previous suggestions.

The third question was related to a more pragmatic concern for the effectiveness of various brief preparatory, non-intrusive strategies for reducing patients' anxiety and pain during dental treatment. Criticisms of the use of hypnosis in dentistry have centered on the fact that some patients and dentists are not comfortable with hypnosis. Furthermore, learning to be an

effective hypnotherapist and apply such treatment routinely might be time consuming (Scott, Hirschman, & Schroder, 1984). The provision of hypnosis via tape-recording and in-person was to investigate the relative efficacy of taped versus live hypnotic inductions. Replications of Barber's RIA method using audio-tapes have failed to show effectiveness comparable to the original study. However, there appear to be inadequacies of the replications. The primary shortcoming of replications of the RIA method come from the failure of these studies to use live, in-person inductions. From this third question led to the hypothesis that the RIA method's effectiveness depended on live presentation. The fourth question was related to the degree of correspondence of variables as would be predicted from the literature or that might support previous findings. For example, does age at first visit correspond with pre-preparation anxiety, and do fear measures have high correlations with pain measures?

Method of Experiment

One hundred adult dental patients were randomly assigned to 5 groups, comprising an equal number of men and women in each group. There were four treatment conditions: (1) direct-induction hypnosis, tape-recorded (DT); (2) direct-induction hypnosis, live (DL); (3) indirect-induction hypnosis, tape-recorded (IT); and (4) indirect-induction hypnosis, live (IL). An additional group, the fifth, was a no-treatment control group that was only requested to respond to the various measures. Patients were recruited from two dental clinics and three dentists were involved.

Measures included a brief history questionnaire, two dental anxiety measurement scales, a trait anxiety scale, dentist and dental assistant ratings of patients' distress, participants' ratings of their fear, pain, comfort, forcefulness of induction, and enjoyment of intervention; a physiological measure (galvanic skin response); dentists' ratings of severity of the dental procedure, cooperativeness of participant during the dental treatment, and time required for dental treatment. This was a group comparison design that required mainly MANOVA, ANOVA, and correlation analyses.

Chapter II contains a representative literature review entailing summaries related to the epidemiology of dental fear, physiological and psychological aspects of dental pain, the relationship of fear and pain experienced during dental treatments, correlates and causes of dental fear, and the treatment of dental fear and pain. The last topic reviewed covers the treatment of dental distress with hypnotherapy. The third chapter specifies the method used in the experiment, Chapter IV the results and a discussion of the results, and chapter V a summary, conclusions and implications.

II LITERATURE REVIEW

The following review of the literature provides discussion related to the epidemiology, causes, and treatment of dental distress. A review of hypnotherapeutic treatments, including literature addressing indirect and direct style comparisons lead to the primary hypotheses at the end of this chapter.

Epidemiology of Dental Distress

Prevalence of Dental Fear

There has been minimal argument that fear is a common experience of dental patients (egs Gale, 1969; Gatchel, 1980; Rankin & Harris, 1984). Some researchers have considered fear to be the main component of the distress experienced by patients (Corah, Gale, & Illig, 1978). Perhaps it isn't surprising that most people react with some trepidation at the prospect of receiving dental treatment, given the invasive nature of dental procedures. Yet there remains a lack of clarity and there are inconsistencies in classifications of people's dental fears.

Even the size of what might seem a simple category like *dental care avoiders* has been difficult to establish. Early estimates of the number of people from the American population who have avoided dental care due to fear were put between 5 and 6% (Friedson & Feldman, 1958; Crockett, 1963). The percentage --14% was more than double as estimated for the Swedish population by an organization in that country (SIFO, 1962). Consistent with the latter figure, in a study by Seeman and Molin (1976), 14% of a Swedish sample comprised of 1375 Swedes between 12 and 75 years of age acknowledged their unwillingness to follow through on dental treatment. Berggren and Meynart (1984) estimated that 5-10 % of the Swedish population has refused to have dental treatment. Another 50% of their sample reported that their visits to the dentist were upsetting.

Weiner (1980a) has estimated that 12-15% of the American population avoids dental care and 35 million more (approximately 15%) experience high levels of anxiety. In a recent survey of dental patients in the U. S., Gatchel, Ingersoll, Bowman, Robertson, and Walker (1983) found that

11.7% of respondents rated their fear as *high* (8-10 on a 10-point scale), and *moderate* fear (5-7 points) was experienced by 17.5%. Evidence that fear lead to avoidance was gained from the fact that 54% of those classified in the *high fear* group had not visited a dentist in more than one year, whereas only 30.1% of the *low fear* group failed to see their dentist within one year. Gatchel et al (1983) concluded that 15.5% of the people surveyed feared dental visits and were dental treatment avoiders. Perhaps the most revealing statistic was that of the moderately and highly fearful groups 62.5% indicated that they avoided dental care because of their fear.

It may be concluded that the proportion of a population that experiences dental fear depends on how fear is defined. If defined as an anxiety state that contributes to dental treatment avoidance, then dental fear affects a small but significant proportion of the population, apparently between 5 and 15%. This group might more accurately be described as dental phobics. A considerably larger number of persons can be included in a *fears the dentist* category if the criterion for inclusion is broadened. Cited in the introduction, Scott, Hirschman, and Schroder (1984) estimated that 80% of dental patients experience anxiety about their treatment. Milgrom, Weinstein, Kleinknecht and Getz (1985) differentiated between fear and anxiety in relation to dental treatment. They defined fear as "an individual's response to a perceived threat or danger" (p. 5), with three components: (1) cognitive-anticipatory, (2) physiological and, (3) behavioral avoidance. According to these authors, anxiety is experientially similar to fear. However, they suggested that anxiety is differentiated from fear in that the threat stimuli or triggers are less clearly present with anxiety, or further away in time. So, from their differentiation, dreading dental treatment when one is safely at home is considered anxiety, whereas the same dread is considered fear if one experiences the reaction in the dental office.

The utility of the conceptual differentiation of fear and anxiety is questionable. How close in time must a reaction occur in relation to a feared situation in order for it to qualify as fear rather than anxiety? The insinuation by Milgrom et al (1985) is that anxiety is less rational than fear. They discounted the possibility that persons with strong abilities to recall previously fearful situations

might be the ones they consider more anxiety prone. Also, from their own definition of fear having three components, anxiety could be equated with the cognitive, anticipatory component. To prevent possible confusion in this thesis I have used the terms fear and anxiety with the assumption that they are synonymous.

Measurements of Dental Fear

Several scales have been developed for the measurement of fear or anxiety related to dental treatment. The scales have been found useful for both psychological treatments and research. The Corah Dental Anxiety Scale (CDAS) was first developed by Corah (1969). It was composed of four questions rated on 5-point scales, with a rating of 1 corresponding to being calm with regard to the item, and 5 relating to being terrified with a particular situation described by the item. Scores then varied from 4 to 20. The original sample of 1,232 college students led to the calculation of a K-R, internal consistency correlation coefficient of .86 and a test-retest reliability coefficient of .82. Corah also reported a significant correlation between the CDAS and dentist's ratings of anxiety. Several other studies have supported the CDAS as a valid dental anxiety measure (egs. Weinstein, Smith, & Bartlett, 1973; Auerbach, Kendall, Cutler, and Levitt 1976; Weisenberg, Kreindler & Schachat, 1974). According to Corah, Gale, & Illig (1978) the CDAS allows dentists to identify particularly anxious patients. They claimed that, "a score of 15 or more almost always indicates a highly anxious patient." Various samples reported in their paper supported the rise of CDAS scores with rise in degree of anxiety. For example, a sample of the general patient population of private practice dentists derived an average CDAS score of 6.40 whereas dental phobics averaged 17.18.

Kleinknecht, Thorndike, McGlynn, and Harkavy (1984) have criticized the CDAS for its inclusion of only three situations that a dental patient might consider frightening. They believed that a wider range of situations and conditions that result in dental patient's fears should have been included. They argued for the use of the Dental Fear Survey (DFS) to provide a sample of a broader domain of fear provoking circumstances. The scoring of the DFS is similar to the CDAS

except the DFS has 20, compared to the CDAS's 4, questions. Kleinknecht et al (1984) reported on a factor analytic study of the DFS, finding three primary dimensions relevant to the dental anxiety construct. The dimensions included a behavioral index of avoidance of dentistry, a scale reflecting the experience of autonomic arousal, and a cognitive component including specific dental treatment situations and stimuli. These factors were stable across four samples and indicative of three, divergent patterns of reaction involving dental fear.

Another self-report index used to measure dental fear has been a modified version of the Geer Fear Scale (GFS). Originated by Geer (1965), a shortened form of the GFS was used by Berggren and Carlsson (1985) to measure the effectiveness of an anxiety reduction strategy used during dental treatment. They found that the modified GFS was an excellent identifier of those patients who were less likely to be responsive to treatment for their dental fear. They surmised that the reason for the ability of the scale to predict negative therapy outcome was based on the fact that the GFS provided a measure of a range of phobias and fears, compared to the singular, dental fear orientation of the CDAS. Consequently, Berggren and Carlsson (1985) concluded that those with high GFS scores were less likely to benefit from dental fear treatment because they had a greater number of fears and because most treatments were not aimed at reducing anxiety experienced beyond dental situations.

Other methods have been used for measuring dental fear. Various physiological devices have been included. For example, Melamed (1979) reviewed studies showing that heart-rate is an accurate and reliable index of dental anxiety. Electrodermal responses and other indicators of autonomic arousal have also been used to measure the physiological aspects of dental anxiety, like galvanic skin response, (GSR)(eg Weisenberg, 1975).

Dentist's estimates of patient's levels of fear and pain have been another source for dependent measures. Typically these have involved brief rating scales on which the dentist indicates, from behavioral observation of patient's requests for medication, responses during treatment, including their cooperation, and how fearful the patient appears. Dentist's ratings have

had close correspondence with patient's own ratings and other measures (Berggren & Carlsson, 1985).

Correlates of Dental Fear

Most studies where dental fear was measured via self-report showed women's scores to be generally higher than men's (Berggren & Meynert, 1984; Corah, 1967, 1978, 1979; Lautch, 1971; Kleinknecht & Bernstein, 1978; and Kleinknecht, Klepac, & Alexander, 1973). However, the higher relative scores obtained by women on the scale might only be a reflection of men's reluctance to admit fear, suggested by Corah, Gale, and Illig (1978) and Rankin and Harris (1984). A study by Berggren and Carlsson (1985) failed to detect significant gender differences in dental fear as measured by the CDAS of a Swedish sample, a finding that conflicted with most earlier studies. The authors speculated that cultural differences might sufficiently explain this result. That is, Berggren and Carlsson (1985) suggested that Swedish men were more likely to disclose information about their anxiety than were American men.

Not unlike most other epidemiological statistics of dental fear, reports of the relationship between dental treatment distress and age have been unclear. Foreman (1979) found that increased age positively correlated with increases in the degree of the fear and the pain reported. Conversely, Kleinknecht and Bernstein (1978) reported a negative correlation of age and distress, those over 40 being less likely to report experiences of anxiety and pain about their dental treatment. Kleinknecht, Klepac, and Alexander (1973) and Donaldson (1982) found that adolescents tended to experience dental fear more often than older age groups. Berggren and Meynart (1984) reported that of 160 patients referred for severe dental fear, more than 80% were 20-40 years of age and 85% of the subjects reported via questionnaire that they began to fear dental treatment before the age of 16. Studies by Rankin and Harris (1984) and Berggren and Carlsson (1985) failed to find any relationships between age and dental fear in their samples.

Similar, equivocal results have been found when researchers considered the relationship between dental fear and socioeconomic status. Friedson and Feldman (1958) found that low

income was a condition of those people who were not inclined to visit a dentist regularly.

According to Gale and Ayer (1969) there was no disproportionate representation by any particular socioeconomic level in a sample who feared dentistry. In a study by Berggren and Meynert (1984), although all of their 160 subjects stated fear as a primary reason for not seeking dental treatment, only two indicated that economics was a factor in not seeking dental care.

Causes of Dental Anxiety

Pain

The expectations of pain and the experience of fear of dental treatment have been found to be causally related (Gale & Ayer, 1969; Kleinknecht, Klepac, & Alexander, 1973; Bernstein, Kleinknecht, & Alexander, 1979; Melamed & Siesel, 1980; Wardle, 1982). In a study by Kleinknecht, Klepac, and Alexander (1973), the two main reasons given for fearing dental work involved the expectation of trauma and having at least one previous painful experience in a dental operatory. Similar findings were reported by Wardle (1982). She found that about a third of the 50 patients in her study attributed their sole reason for anxiety to the anticipation of pain. Another 44% (22) of the 50 considered their anxiety to result from both pain and unpleasantness. Added to these findings, Nesbitt and Wilson (1977) found that when a group of patients rated various dental treatment procedures, their ratings of the fear and the pain of the procedures were highly correlated. Also, they found that a much smaller percentage of a low fear group expected their treatment to be painful, whereas a high fear group contained many who expected painful treatment.

Berggren and Meynert (1984) have suggested a somewhat different notion about the relationship between fear and dental pain. They postulated, consistent with the findings of Klepac, Dowling, and Haugh (1982), that "it was not pain itself that created fear and avoidance, but rather something about the response to pain." (p. 250) Where the onset of dental fear began in adulthood, Berggren and Meynert (1984) found that those patients would more frequently rank pain highly as a cause of their fear. For those who reported an earlier onset of fear, the dentist's

professional behavior was more often cited as having a bearing on their fear. Nevertheless, Berggren and Meynert (1984) found that in patient's ratings of desirable attributes of dentists, *tries to avoid pain* was ranked #1 and #2 by men and women, respectively.

The close relationship of anxiety to pain has been supported by other research findings as well. For example, Wardle (1982) has found that as the pain experience of various dental procedures increases so do indices of anxiety. Wepman (1978) and Weiner (1980b) have argued that anxiety actually has deleterious effects on pain tolerances and thresholds.

Joy and Barber (1977) provided a neuropsychological description of the interaction of emotion and pain. They argued, from the standpoint of Melzack and Wall's (1965) *gate control theory* of pain, that there are two distinct aspects of one's experience of pain, namely -- perception and reaction. In this analysis, at the point where the strength of a given pain-producing stimulus leads to a reaction, this reaction necessarily involves an emotional component. According to Melzack and Wall's theory, a structure located at the posterior horn of the spinal column, called the *substantia gelatinosa*, acts as a gate that modulates neuronal transmissions. The nerve impulses can either be transmitted (opened) or blocked (closed) to activating cells of the CNS, depending on two main factors. One factor involves the comparative input of transmissions from large and small fibers to the substantia gelatinosa. The second main factor involves a *central biasing mechanism* whereby emotions, particularly anxiety, can modulate the effects on activating cells. Stimulation is first picked up through receptors and transmitted via periphery neural pathways to centers of pain reception in the brain and brainstem. The impulses are then carried along the trigeminal nerve to the *gasserian ganglion*, and to the dorsal root and the spinal column, with ascending and descending branches. From Joy and Barber's (1977) analysis, initial or *epicritic* pain has minimal emotional content and is hypothesized to be transmitted along larger diameter, A-delta fibers. *Protopathic* pain, they postulated, is a more emotionally based pain that evokes evasive behavior after producing sensations of burning or achiness. This emotionally charged pain is considered to be carried along much smaller C-fibers,

having connections with the limbic system. Increasing the relative amount of large fiber input will narrow or close the pain gate. Therefore, protopathic pain is much more likely to have the effect of opening the gate and lead to a painful reaction.

From these studies that have centered on the interaction of fear and pain, for dental patients it may be assumed that their experience involves a self-feeding, fear-pain loop. Where they anticipate pain they experience fear that lowers their pain threshold, which leads to more fear, and more pain. In the next section I will describe research that considers various early experiential foundations of people's dental anxiety.

Early Experience

Many studies have claimed to show that adult dental fear originates in childhood (egs. Schwartz, 1964; Jacobs & Nicastro, 1978; Marks, 1978; Rankin & Harris, 1984). According to Rankin and Harris (1984), dental anxieties are more likely to develop in childhood, because children are most "vulnerable to anxiety" (p. 44). They postulated that such vulnerability, combined with their families' and peers' fearful attitudes, may lead to dental anxiety. Rankin and Harris (1984) reviewed the main body of research where the effects of vicarious and direct traumatic experiences on dental fear were tested. That many dental patients acquired their fearful attitudes from family members or others, and brought these attitudes to first and subsequent dental visits was a finding common to many of the, mainly, survey studies (Lautch, 1971; Kleinknect, Klepac, & Alexander, 1973; Jacobs & Nicastro, 1978). Early traumatic experiences involving severe pain or highly demanding circumstances in the dental operatory, and negative dentist behavior were found to be related to subsequent dental anxiety for many patients (Bernstein, Kleinknect, & Alexander, 1979; Cohen, Snyder, & Labelle, 1982; Gatchel, 1980; Kleinknect, Klepac, & Alexander, 1973; Lautch, 1971). Further support was gained from Rankin and Harris (1984) questionnaire study. They found a significantly positive (but low) correlation between a measure of vicarious anxiety and dental anxiety scores. Also, they found a close relationship between dental anxiety scores and the degrees of trauma that patients experienced

in past dental relationships. They were somewhat surprised by how patient histories of "good" and "bad" dental experience corresponded with current dental fears, finding that the dental anxiety scale scores of patients with a history of good experiences, before and after a bad experience, were lower than the dental anxiety scale scores of patients with a history of only good experiences.

Another recent study linking early experiences with current dental anxiety was conducted by Berggren and Meynart (1984). They found that 54.9% of their sample of 160 dentistry-fearing patients had family members who had dental fears. A large proportion, 76.3%, reported that their dental fear began following one or several traumatic experiences. Moreover, for 85.3%, their dental fear began in childhood. Those patients who attributed their ongoing dental anxiety to traumatic experience tended to cite *pain experience or dentist's professional behavior* as causes. The dentist's professional conduct described included: insensitivity, thoughtlessness, and the use of force. Fear onset in childhood was more often blamed on a rough dentist, whereas fear beginning in adulthood was attributed to painful treatment.

The Dentist

Milgrom, Weinstein, Kleinknecht, and Getz (1985) reported that 50% of a group of fearful dental patients compared to 30% of a group of nonfearful patients gave negative appraisals of dentists. To these authors the difference was explained by a contribution of fear caused by dentists in some cases. They also found that "negative attitudes" toward dentistry were considered more affected by the dentist than by pain (p. 24). In other words, the dentist contributed more to negative attitudes. In addition, patients ranked what they considered to be the most fear provoking aspects of a visit to the dentist. Of the top 10, 2 were connected with critical statements by the dentist. It appears that by their manners and by statements they make about their patients' dental health, dentists might contribute to their patients' fears. Dentist-patient relationships were discussed more fully in a later section on non-intrusive treatment of dental distress.

Psychopathology

A line of research has been conducted to investigate the assumption that those who experience dental anxiety also experience psychopathology. One of the earlier studies of person's who avoid dental treatment due to fear was conducted by Lautch (1971). He found that avoiders had higher neurotism scale scores than non-avoiders on the Eysenck Personality Inventory (EPI), concluding that avoiders were probably more likely to be neurotic. Klepac, Dowling and Hauge (1982) criticized Lautch's (1971) conclusion, claiming that the differences between the two groups might be equally well explained by the fact that the non-avoiders, the fearless group, had scores significantly lower than normal.

Jacobs and Nicastro (1978) have postulated that dental fear and distress results from psychological associations with the mouth cavity. Their assertion was based on observations that the mouth is an infant's first and most important main contact with the environment, receiving erotic stimulation and the nourishment of food, drink, and air. The mouth is a critical part of the anatomy that the child naturally needs to protect. Furthermore, they argued that symbolism is involved for the young child where oral cavity treatment might represent trauma, like an invasion of privacy. Jacobs and Nicastro (1978) also asserted that the fear of dental treatment can be a sub-fear of fear of the unknown, fear of injury or pain, and fear of separation from the mother.

Studies where anxiety has been linked to lower pain thresholds have already been mentioned (egs. Wepman, 1978; Weiner, 1980). One could argue that individuals with trait anxiety related to other psychological disturbances would be more predisposed to dental distress. Berggren and Meynart (1984) found that dental phobic patients with more generalized phobic reactions, as measured by the Geer Fear Scale, were less likely to be successfully treated for their dental phobias. Of the 160 patients referred for dental anxiety 48.8% were being, or had been treated for psychiatric conditions and 31% were on psychoactive medications. Additionally, 64.6% admitted experiencing head and stomach aches frequently, and a high proportion had been raised or lived with families with psychiatric problems. Although their group was not

compared with a more random population sample, the findings suggest disproportionate degrees of psychopathology in a dental phobia sample.

In a more recent study Berggren and Carlsson (1985) assessed the fears of 67 dental patients with the CDAS, the Geer Fear Scale, and dentists' ratings. They also found that those scoring high on the GFS did not respond to treatment of dental fear. This finding suggests that there is a subgroup of dental fearing people who have more generalized fears, because the GFS provides measures of responses to a range of traditionally phobic objects and situations.

Waiting Time.

Increased time of anticipation of dental treatment by itself can contribute to higher fear levels based on patients self-report anxiety ratings. In a study by Coffey and DiGiusto (1983) it was found that longer waiting times contributed to higher anxiety levels of patients awaiting dental treatment.

The Treatment of Dental Distress

The following representative review will describe research and study in two broad areas of treatment, intrusive and non-intrusive. The former methods are primarily pharmacological, whereas the latter are psychological. Emphasis is given mainly to non-intrusive treatment strategies, including an in-depth review of hypnotherapeutic applications.

Pharmacological Agents and Methods

According to Malamed (1985) "history has demonstrated that it has been members of the dental profession who have consistently been in the forefront in the research and development of new techniques and medications for the management of pain and anxiety." (p. 3). He elaborated on the history of anesthesia that began in the 1840's when a dentist named Horace Wells was the first to use nitrous oxide and T. G. Morton, a dentist and physician, was the first to use ether to manage the pain accompanied various surgical procedures. Also according to Malamed (1985), dentists pioneered the use of general anesthesia for ambulatory dental patients

in the 1930's, a practice that wasn't copied by physicians until the 1970's, for patients undergoing short-stay surgery.

A plethora of new chemical anesthetics and sedatives have been developed for dentistry since the first days of nitrous oxide and ether, nearly 150 years ago. Allen (1984), Caplans and Green (1983), and Malamed (1985) have written some of the most comprehensive works on the uses and effects of medications for dental treatment. Following are descriptions of commonly used sedatives, local and general anesthetics, and the advantages and possible risks associated with the administration of these medications.

Sedatives and Anxiolytics: Premedication

Drugs used to sedate or to reduce anxieties of dental patients have included narcotics, barbiturates, non-barbiturate sedatives (hypnotics), benzodiazepines, and nitrous oxide (Allen, 1984; Caplans and Green, 1983; Giovannitti, 1984; Malamed, 1985). Diazepam, and more recently Ativan, both benzodiazepines, are perhaps the most frequently used medications in dentistry to relieve anxiety (Allen, 1984). It has been well documented that diazepam can quickly and effectively reduce the anxiety of an apprehensive dental patient, contributing to the comfort of both patient and dentist by allowing for more rapid, less painful treatment (Bradley, 1981). Considering that diazepam is probably the most representative anxiolytic, I have reviewed some of the recent literature related to the drug's use in dentistry.

The anxiolytic effects of diazepam in dental treatment were first documented by Davideau (1966). The drug, with one trade name being *valium* has otherwise become a popular anxiety reduction agent, and a household term. Diazepam has gained wide acceptance for use by dentists for its anxiolytic effects. More recent studies have reported that diazepam can also decrease pain perceptions, by interfering with memories of and sensitivities to pain. In a study of the effects of intravenously administered diazepam, Kaufman, Dworkin, Leresche, Chen, Shubert, and Benedett (1984) found that the drug has analgesic properties and that the more typical anxiolytic actions that have been observed might be associated with its pain reduction

effects. With the reported interactive effects of pain and anxiety, this hypothesis is not entirely untenable. However, with this conclusion Kaufman et al (1984) seemed to overlook the fact that there have been innumerable cases of anxiety reduction by diazepam for patients who didn't also experience pain. Nevertheless, diazepam is established as an anxiolytic that has a fairly rapid onset and effective action for about one hour, with only minimal cardiorespiratory depressive effects, ease of administration, beneficial amnesic effects, and no loss of consciousness (Allen, 1984).

A few physiological risks have been identified with the use of diazepam for short-duration, infrequent dental treatments. These can include: transient tachycardia, drowsiness, motor-incoordination, and delayed recovery (Allen, 1984). Physical addiction is a risk with longer term use.

However, there appear to be potentially hazardous psychological drawbacks for patients given diazepam treatment. Baker, May, Revicki, Kessler, and Crawford (1984) found that orally administered diazepam had an effect of reducing anxiety, as indicated with a state-anxiety measure for the particular time it was administered, but had no measurable effect on patients' dental fear scores. This finding suggests that diazepam can reduce anxiety while it is physically active, but does not generalize over time to contribute to a lessening of the fear of later dental treatments. An implication of the Baker et al (1984) finding is that patients learn to rely on an external substances, continuing to fear dental treatment. This could cause lowered self-efficacy for coping with dental fear and pain, and perhaps contribute to generally lower self-confidence and self-worth (Hallstrom & Halling, 1984). Foreman (1984) also commented on dentists' overreliance on drugs for the management of patients' dental fears, and suggested a variety of alternative approaches for such treatment.

Besides anxiolytics like diazepam from the benzodiazepines group, there are several other drug types that have been used to premedicate dental patients. Giovanitti (1984) has provided a comprehensive description of orally administered preoperative medications including

narcotics, barbiturate and nonbarbiturate sedative-hypnotics, and nitrous oxide. A summary of the primary beneficial and adverse effects of these agents is given as follows:

Narcotics: the typical effects of narcotic medications are sedation and possible euphoria. Demerol is one example. Narcotics are not used as often as benzodiazepines because of their depressive effects on respiratory and cardiovascular systems. Also narcotic administration can complicate dental treatment by contributing to airway obstruction, hypoventilation, and hypotension. Another disadvantage of these drugs is the fact that sedation effects can be highly variable from one patient to another. Adverse effects can include gastrointestinal disturbance, dysphoria and confusion.

Barbiturate, sedative-hypnotics: these drugs normally have sedative and hypnotic effectiveness but, like narcotics, they create respiratory and cardio-vascular depression. Paradoxically, these barbiturates can lead to general excitation and pain-threshold decreases.

Sedative-hypnotic, non-barbiturates: the most frequently used from this category is chloral hydrate. These drugs, like barbiturates, cause CNS depression and highly variable sedative-hypnotic effects. Additionally, they often contribute to epigastric distress, sometimes leading to nausea and vomiting.

Nitrous Oxide: used for both pre-sedation and anesthetic effects, this gas is known to contribute to relaxed, somnolent, and dissociated states. Hypotheses have been put forward suggesting that nitrous oxide works through enhancing endorphin release, although this has yet to be substantiated. Advantages of the use of this sedative over others are related to its minimal effects on cardiovascular and respiratory systems. Among the disadvantages of the use of nitrous oxide is the drug's tendency to cause ataxia and discoordination. Also, the drug is weak relative to other anesthetics, patients develop tolerance to its analgesic effects, and it has been implicated with a variety of other problems including bone marrow changes, anticholinergic syndrome (post-anesthetic excitement), and spontaneous abortion.

Local Anesthesia

In dentistry, local anesthesia is the most widely used method of pain control. Yagiela (1985) has provided a review of the use of local anesthetics in dentistry. From his analysis, there have been momentous advances in the uses of local anesthetics. Local anesthetics "can depress conduction in all excitable tissues, peripheral nerves, neurons in the brain and spinal cord, and cardiac, skeletal, and smooth muscles." (p 49). In recent years, according to Yagiela (1985), there has been a transition from using ester-based anesthetics to using more efficient, amide-based agents. Generally, improvements have led to dentists having more control over the durations, localization, and intensity of anesthesia.

Notwithstanding these advances, there remain dangers and disadvantages with the administration of local anesthetics. Yagiela (1985) mentioned that an error leading to inadvertent, intravascular placement might cause high cerebral concentrations of an anesthetic, possibly resulting in the development of seizures. In an outline by Allen (1984) regarding the use of injectable local anesthetics, he mentioned syncope, allergy, broken needle, hematoma, pain, paresthesia, and unwanted anesthesia among the disadvantages of using injectable local anesthetics. Recently, Fiset, Milgram, Weinstein, Getz, and Glassman (1985) discussed patients psychophysiological responses to dental injections. They estimated that between 2 1/2 and 11% of the dental patients who are given local anesthetics experience adverse autonomic reactions. These reactions have not been experienced as frequently by patients in medical settings. Fiset et al (1985) explained their observations by the fact that dentists often combine vasoconstrictors like epinephrine with an anesthetic to improve anesthetic efficacy. They argued that with this practice dentists have increased the likelihood of adverse reactions, because many patients release high amounts of endogenous epinephrine as part of a fear response. The injected epinephrine combined with endogenous epinephrine leads to higher levels of autonomic arousal and possibly adverse psychophysiological responses.

General Anesthesia

A recent review of the pharmacodynamics of general anesthetics used in dentistry was provided by Milam (1984). He estimated that approximately 20% of the general anesthetics administered in the United States were done for dental procedures, particularly for children, highly anxious individuals, persons with mental handicaps, and for those with certain medical conditions. There are obvious advantages for the particular patients, like those mentioned, whose behavior or emotional reactions might interfere with treatment. Extensive dental work can be done in one session and the risk of death is minimal. Milam (1984) provided an estimate indicating that only about 1 in 280,000 administrations of general anesthetic results in death.

The primary disadvantages associated with general anesthesia relate to financial cost and adverse health effects. The specialized care required for the administration, maintenance, and recovery time involved in general anesthesia results in high financial cost. Milam (1984) also provided descriptions of some of the potential health risks with general anesthesia; prolonged drowsiness, anterograde amnesia, epileptiform effects, and dysrhythmias were among the risks mentioned.

Conclusions

Dentists have contributed to the development of a variety of drugs used to prepare patients for invasive procedures. Most agents have been utilized to reduce fear and pain. It seems generally accepted that for most dental patients, fear and pain can be controlled with medications for the time of the procedure. However, for all these drugs there are concerns about potential harmful effects. In terms of dental distress, despite improvements in pharmacological efficacy there continue to be large numbers of people who report experiencing anxiety and pain related to dental visits. Indeed, some evidence has suggested that the management of fear with drugs actually interferes with individual's overcoming their fear of the next treatment session. It might be assumed that those who are given drugs to cope with fear come to doubt their own resources for overcoming fear.

Sokol, Sokol, and Sokol (1985) have provided a concise summary and rationale for, the use of non-intrusive, non-pharmacologic therapies to treat patient's fear and pain in dental clinics. Much of the rationale has been given in the previous section of this proposal through specific descriptions of hazardous drug effects. The Sokols (1985) submitted that difficulties establishing proper dosages, waiting for effects of incremental administrations, idiosyncratic reactions, and the need for syringes are all considerations that should lead to preferences for non-intrusive therapies. This main section of the literature review provides an account of the more common, psychologically based therapies used to alleviate dental patients' distress. Factors pertaining to the relationship between dentist and patient will be covered first with descriptions of specific methods of fear and pain reduction to follow.

Dentist-Patient Relationships.

The impact of dentist-patient relationships on processes and outcomes of dental treatment were alluded to in the previous section of this thesis, on correlates and causes of dental distress. Relationships between the ways dentists interact with patients and patient's fears were reported by Bernstein, Kleinknecht, and Alexander (1979). They found that dentists' personal characteristics and professional conduct were rated negatively by more than 50% of a group of patients who were assessed to be highly fearful of dental treatment. Beyond their responsibility to provide the technical aspects of dental treatment, what must dentists do to enhance the probability that patients will experience comfort, will more likely return, and be cooperative in future dental treatments?

Thomas (1929) and Best (1930) were among the first to advocate that dentists consider the importance of the dentist-patient relationship. Thomas (1929) suggested the need to care for the "whole person", not just one's teeth. He described the treatment of a woman who felt that the success of her treatment was as much attributed to the trust and faith that she developed in the dentist, as the mechanical aspects of the treatment of her teeth. Best (1930) commented on patients' anticipation of pain and suggested that child and adult patients should make

prophylactic, non-painful visits every three months so as to provide patients with comfortable exposure. He also discussed the need for patients to feel more in control during treatment, suggesting that dentists could use a switch whereby patients could control the dentist's drill. Another suggestion made by Best (1930) was that dentists should help their patients with the prevention of dental problems, advising that patients be given advice about diet related to tooth decay.

The early writings set the theme for later study into the relationships between dentist-patient interactions and patient comfort and satisfaction. Raginsky (1968) from an analytic position concluded that, due to the daily stresses they experience, many dentists tend to become self-protective and defensive, camouflaging their personal insecurities and contributing to less positive interactions with patients. He cautioned, therefore, that dentists should be free from narcissism and other mental or physical symptoms. Regarding fear reduction, Raginsky (1968) added that a "kind dentist" is more helpful for a patient than are myriad complicated, mechanistic procedures. Bartlett (1970a) attested to the importance of a "good interpersonal relationship with the patient . . . [which depends upon] . . . the attitude of trust, confidence, friendship, and respect." (p. 128) He added that if the dentist intends to use a method like hypnosis, a positive interpersonal relationship by itself can be hypnotic.

Should dentists routinely give information to patients about planned procedures? That dental patients should be thoroughly, psychologically prepared for surgery by being given information about procedures was proposed by Janis (1958, 1971), Janis and Mann (1977), and Weisenburg (1973). Janis (1958) conducted experiments to examine the relationships between preoperative fear and post-surgical recovery with medical patients. In a survey study he found that the best postoperative adjustments were shown by those patients who had a moderate preoperative fear level. From this and subsequent studies Janis (1971) and Janis and Mann (1977) posited that moderate levels of fear stimulate the "work of worrying" a covert activity that enables patients to inoculate themselves and cope with stresses of surgery. Unfortunately, there

has been minimal support for the theory that high and low preoperative fear is associated with poorer postsurgery adjustment (Anderson & Masur, 1983). In fact, other studies tend to report a more direct, linear association of fear and adjustment (egs. Auerbach, 1973; Sime, 1976). After reviewing the literature, Weisenberg (1973) concluded that frank and direct information provided to mildly and moderately fearful dental patients served to reduce anxiety, hasten recovery, and contribute to higher patient confidence. Siegal and Peterson (1980) found that providing information about dental procedures is a method that can, by itself, lead to more positive dental treatment outcomes by reducing patients' pulse rates and anxiety related behaviors, and increase their cooperation. Also in relation to the dentist providing information about procedures, recently Johnson, Chapman, and Huebner (1984) found that dental patients who were provided information about their treatment and, in addition, were instructed with a relaxation procedure, showed less subsequent anxiety on several measures than did either of two separate groups, given information or relaxation alone.

Joy (1983) suggested that the methods found to be most effective for reducing anxiety about dental procedures has included those that maximize trust, confidence, and empathy in the relationship between patient and dentist. These are qualities that have also been considered essential for effective psychotherapy. On this theme, Gale, Carlsson, Eriksson, and Jontell (1984) experimented by introducing two groups of dental patients to two different dentist styles. They found that a patient rated a dentist more favorably if the dentist communicated with them than if the dentist was less interactive. From these findings they suggested that dentists should be active and positive with their patients. Similarly, Corah, O'Shea, and Bissell (1985) found that the relaxed demeanor of the dentist, that is, the dentist's inclinations to be reassuring, listen carefully to patients, and encourage questions, were factors strongly related to patient satisfaction. However, these positive dentist activities seemed to have minimal effect on patient's anxiety levels. It appears that more study is required to examine the effects of dentist's styles of interaction on patient's anxiety, apart from effects on patient's satisfaction.

Early Exposure

This has been another preparatory practice that, like information giving and empathic understanding, can be applied by dentists without too much additional time. Dentists can easily incorporate a routine of allowing new dental patients painless exposure to the treatment environment. It has been well established that the onset of dental fear usually begins in childhood (eg. Shoben & Borland, 1954). In a group of white, male, upper-class children fear was found to be the most influential factor for parents not to take their child to the dentist (Kleiman, 1982).

As previously mentioned, Best (1930) suggested that children be taken to the dentist for pre-treatment or non-painful prophylactic treatment. It was assumed that these early visits would prevent an automatic connection being made between dental visits and pain, reducing the apprehensions of young children. Many writers (eg. Ayer, 1983) have since advocated the effectiveness of exposing children to the dental environment early, before any involved dental treatment is needed. There have been few studies on the effectiveness of previsits for reducing fear of the dentist. In one, Rosengarten (1961) found that previsits were highly effective in reducing the fears of children 3 to 4 1/2 years of age, but not children between 5 and 5 1/2 years. Perhaps for the older children there was sufficient time to be influenced by the fearful dental attitudes of family and peers.

Modeling.

Modeling has been successfully employed to prevent the development of fear of dental treatment and to encourage children and adults to display confident, cooperative behavior in the dental clinic (Akers, Green, & Yates, 1974; Bernstein & Kleinknecht, 1982; Gatchel, 1986; Gordon, Terdal, & Sterling, 1974; Johnson & Machen, 1973; Machen & Johnson, 1974; White, Keys, Field, & Karboot, 1978). Modeling studies were stimulated by social learning research and theory undertaken by Bandura (1969). Until that time learning was considered mainly from

classical and operant conditioning positions. The social learning perspective gave credence to views about observational learning, that people learn by observing the actions of others.

Machen and Johnson (1974) used modeling to teach appropriate dental behavior to a group of children. They found that an 11 minute videotape of a child who was modeling calm and adaptive dental behavior was as effective as systematic desensitization in producing more desirable dental behavior. The behavior learned by the children who were shown the video was measured to be significantly more adaptive than that acquired by children of a control group. Reporting on two separate cases Gordon, Terdal, and Sterling (1974) and White, Akers, Green, and Yates (1974) demonstrated the use of modeling with desensitization, and modeling alone, respectively, finding it effective for treating the dental phobias of two children. Using a videotaped model showing the successful reception of dental procedures Malamed, Weinstein, Katin-Borland, and Hawes (1975) reported on the reduction of fear-related dental management problems. Fields and Pinkham (1976) also reported on the successful teaching of adaptive dental behavior using modeling procedures with children.

Later studies began to look at more specific variables of modeling films and their effects on reducing individual's anxiety related behavior. Melamed, Yurcheson, Fleece, Hutcherson, and Hawes (1978) provided a variety of modelling treatments to children who differed in their previous experience with dental treatment. They showed that films of mastery modeling (children mastering the situation) were more effective in reducing dental fears. However, they also found that the effectiveness of treatment depended on previous dental treatment experience. Children with extensive treatment experience were more likely to respond positively to a short demonstration or a long modelling film, whereas children with less treatment experience were more likely to show reductions in fear-related disruptive behavior when shown a long demonstration, or a short duration modeling film.

Using two experimental groups in three separate studies Klorman, Hilpert, Michael, LaGana, and Sveen (1980) compared controls with treatments of mastery modeling and coping

modelling. Results were mostly negative, with only one measure, a rating of disruptiveness, found to change significantly in only one study. These results indicated that the children were largely unaffected by the modelling treatments on several physiological measures and rating scales.

In a rare study on the effects of modelling procedures on the dental fears of adults, Bernstein and Kleinknecht (1980) compared participant modeling, symbolic modeling, and graduated exposure with two control conditions. One control was an attention-placebo and another was given what was referred to as a *positive dental experience*. Participants included 33 adults who previously avoided dental treatment from 1 to 10 years. All, including controls, reported a reduction in anxiety for the dental situation and expected pain. Furthermore, there were no significant differences between groups on measures of fearful behavior or responsiveness. Bernstein and Kleinknecht (1980) reported that 50 to 85.7% of their subjects were able to move to regular dental care, and the highest proportion of those who began to seek regular care, 87.5%, were from the participant modeling condition. However, this result is less relevant when one considers that 83.3% of the attention placebo group also began to see a dentist regularly. Recently, Zachany, Friedlander, Huang, Silverstein, and Leggott (1985) failed to demonstrate, that a treatment involving children passively observing a filmed model who coped effectively with dental treatment, was effective in reducing distress during dental procedures. The effects of modeling preparations compared with control treatments for reducing individual's anxiety and pain expectations need to be studied more extensively, especially with adults.

Behavior Modification

Various behavioral strategies have been attempted to prevent or reduce dental patients' distress. In discussing these behavior management or modification procedures I have limited the consideration to methods that concern classical and operant conditioning principles. Behavior therapy strategies like systematic desensitization and relaxation have been reviewed individually.

Most studies on the effects of behavioral treatments and dentistry have involved children, often mentally handicapped children. Kohlenberg, Greenberg, Reymore, and Hass (1972)

showed how positive reinforcement, shaping, and fading procedures successfully increased the cooperative dental behavior of 17 mentally retarded children and adults between 8 and 20 years of age. The behavioral improvements included increases in the amount of time they kept their mouths open and decreases in restraints needed. Drash (1974) provided a summary of behavior modification strategies that could be used with handicapped children. The methods included positive reinforcement, shaping, and modelling. Light and Alterbaum (1975) described their successful use of behavior modification procedures with a cleft palate patient.

The use of preventative dentistry approaches involving behavior modification with adults was described in a paper by Evans (1978). Self-monitoring, including the recordings of times, places, and situations of brushing and flossing, environmental planning, arranging places where implements would be available, contingency contracting, reminder notes, and self-rewards were among the methods discussed. These methods incorporated both classical and operant conditioning principles of reinforcement and stimulus control.

Aversive procedures for controlling children have also been suggested by some dentists. One controversial technique is was called the *hand-over-mouth* method (Keys, Field, & Karbout, 1978; Rombom, 1981). It was simply developed as a strong-arm strategy where the dentist firmly places a hand over a child's mouth, to gain the child's attention, and gain an opportunity to give directions while, ostensibly, getting the child to be calmer and more cooperative. Some have characterized those who use the method as authoritarian and overcontrolling (Joy, 1983). The method has stirred some controversy in the dental literature as views polarized about the ethics and legality of using the technique (Bowers, 1982).

Systematic Desensitization

The behavior therapy technique of systematic desensitization (SD) originated by Wolpe (1958) has been used extensively by psychotherapists to treat more extreme problems of dental fears, usually dental phobias. The procedure has required that the client first be taught progressive, deep muscle relaxation. Then a series of about 10 imagined scenes, related to

anxiety provoking stimuli, is described and arranged in hierarchical order, from least to most fear provoking. As the client maintains a state of relaxation, the hierarchy of scenes is presented one at a time. The procedure has been postulated to work by *reciprocal inhibition* (Wolpe, 1958) whereby the person comes to experience imaged scenes of approaching and undergoing dental treatment while relaxed, and cannot be anxious and relaxed at the same time.

Earlier studies reporting the application of SD for problems related to dental treatment were mainly single case reports. Savage and MacGregor (1970) used SD successfully to eliminate problems that one dental patient had with gagging. Mason (1973) successfully treated a 12 year old girl who had a phobia of injections that precluded her receiving dental treatment for 3 years previously. Similarly, Gordon, Terdal, and Sterling (1974) used SD as part of a treatment for a phobic child patient.

A group of children were treated with SD in a study by Machen and Johnson (1974). The treatment resulted in a reduction of uncooperative behaviors, some related to fear. Shaw and Thoreson (1974) developed an eight-session treatment program combining SD and modelling to reduce the anxiety of dental phobics. Also using a combination of treatments, Litchfield (1979) reported on merging SD with hypnosis to effectively treat a phobic dental patient. Although not describing research per se, many other reports in the literature have attested to and advocated the use of SD for dental anxiety and phobias (Kaplan & Rubin, 1984; Morely, Netley, & Tittley, 1979; Pinkham & Schroeder, 1975; Weisenberg, 1973; Wright & Lange, 1978). Kaplan and Rubin (1984) reported on an elaborate program of a dental phobia clinic situated at Mount Sinai Hospital in New York. An integral part of their treatment has included SD. As well as reporting on the treatment of a dental patient with injection phobia, Camner, Anderson, and Eurinius (1983) suggested that SD treatments are not necessarily the exclusive domain of psychologists and psychiatrists, that dentists could implement such treatment. They argued that SD is relatively easy to apply.

In an elaborate group comparison study, Berggren and Lunde (1984) compared the effectiveness of behavior therapy treatments, including SD, to the effects of general anesthesia (GA). The subjects who participated in the study included 99 adults who had previously avoided dental treatment due to fear. About one-half of the patients were treated with SD and biofeedback. The rest were given general anesthesia. Following the treatments, Berggren and Lunde (1984) gave preference to the behavior therapy. The dental treatment regimes were completed by 73% of the behavior therapy group compared with 53% of the GA group. Moreover, the behavior therapy group showed a higher mean reduction in dental anxiety, a better adaptation to the dental treatment situation, and fewer instances of being absent or late for appointments.

Relaxation Training

There have been numerous methods for relaxing dental patients. Most pharmacological agents used in dentistry have been for purposes of relaxation (Joy & Barber, 1977). Otherwise, instructions for the progressive relaxation of muscle groups have been the most commonly employed methods (egs. Corah, Gale, & Illig, 1979; McAmmond, Davidson, & Kovitz, 1971), although hypnosis (Hilgard & Hilgard, 1983) and biofeedback procedures (Buonomano & Buonomano, 1979) have been used extensively to foster relaxation and prevent pain. That relaxation is important for reducing the distress of dental patients has two supporting assumptions, 1) Anxiety and tension contribute to lower pain thresholds and tolerances and more intense pain experiences (Hilgard & Hilgard, 1983); 2) while a patient is relaxed they cannot be anxious (Wolpe, 1958).

Some have vehemently opposed the use of hypnosis in favor of standardized relaxation procedures to relax dental patients before treatment. For example, Gutwirth (1965) argued for relaxation training as a preference, stating:

Hypnosis, of course, is controlled by the hypnotist. Rather than cultivating strength of will, it does the opposite. Self-reliance is in no manner improved. A patient's fears can occasionally be calmed under hypnosis. However, this occurs at the expense of his perception and understanding. Momentarily, to a certain degree, he has lost his emotional freedom, since his emotions are at the hypnotist's command. In addition, he has lost control of his mind. (p. 16)

Others have shown that hypnosis can be more effective. McAmmond, Davidson, and Kovitz (1971) compared the effects of relaxation training and hypnosis on individual's stress reactions during dental treatments. The group of subjects who were given hypnotic inductions for relaxation showed more post-treatment approach behavior to dental treatment settings than did the group who received only relaxation instructions. However, for all patients who displayed low physiological arousal initially, there were no differences between the two treatments. Some authors have equated relaxation with hypnosis for the treatment of dental distress (Cook, 1977).

Weisenberg (1973) described at length the desirability of careful preparation of patients for dental surgery. He advised that relaxing preparation is an important element of the process that can increase confidence and trust between patient and doctor, and hasten recovery. In his discussion Weisenberg (1973), from a behavioral viewpoint, noted that both relaxation and hypnosis procedures were effective for pre-treatment preparation. Eversaul (1976) provided an account of the use of biofeedback to facilitate the development of relaxation responses in dental patients who were about to undergo treatment. Also using biofeedback assisted relaxation therapy, Canistraci (1976) reported on the successful control of bruxism.

Using progressive, deep muscle relaxation methods Cosgrove (1976) reported on the reduction of dental patient's fears, and Eigenbrode and Affalter (1976) and Cook (1977), using muscle relaxation combined with imagery, claimed to successfully treat a patient with severe dental phobia. Applying what they called the *dental relaxation method*, Sax and Zoeller (1979) pre-treated dental patients, resulting in significant anxiety reductions. They called their method an American version of meditation whereby patients repeated pleasant and relaxing words or

phrases silently in their minds, with their eyes closed. Corah, Gale, and Illig (1979b) found that two groups given relaxation and distraction treatments respectively, showed a reduction of dental treatment distress compared with controls. They noted that the distraction procedure, having the patients play a video game on the ceiling while receiving dental treatment, was preferred by most patients.

In a study by Lamb and Strand (1980) a 14 minute tape-recording of a relaxation procedure was played to dental patients. The researchers found that the patients significantly reduced their state anxiety. In conclusion, Lamb and Strand (1980) offered that more involved, time consuming and costly treatments might not be necessary as taped, relaxation procedures can be easily and effectively incorporated just prior to patient's dental treatment. Mentioned in the previous section on systematic desensitization, Kaplan and Rubin (1984) described treatments often used at the dental phobia clinic of Mount Sinai Hospital. Among the behavior therapy methods used, relaxation procedures were applied alone, or in conjunction with other methods like SD.

Finally, Johnson, Chapman, and Huebner (1984) studied the effects of stress reduction prior to oral surgery, finding that a group of patients given pre-treatment information about procedures, along with a relaxation experience, had more significant mean reductions in anxiety than did groups who received either information or the relaxation procedure alone. The dependent variables included self-report, electromyogram, and peripheral temperature measures as indices of anxiety.

Cognitive-Behavior Therapy

Examinations of cognitive aspects of human learning and performance now rate highly in the psychological literature of learning theory and treatment. Where 15 years ago mainly conditioning and strict behavioral formulations were accepted in the sphere of behavior therapy, currently ideas about the role of cognition have gained prominence (eg. Meichenbaum, 1977). The combining of cognitive and behavioral methods developed from a desire on the part of

researchers to retain the precision and other technical aspects of behavior modification while meeting rapidly growing theoretical and practical concerns about the important role of cognition. Cognitive-behavioral methods have since been extensively developed and applied in research, education, and psychological treatments.

As they have been used to prepare patients and minimize the distressing effects of invasive medical and dental procedures, these cognitive-behavior therapy (CBT) methods have included cognitive reappraisal, distraction, and stress inoculation methods (Anderson & Masur, 1983). In one of the earliest CBT applications with medical patients, Langer, Janis, and Wolfer (1975) sought to reduce the stress of surgery patients. Their treatment required patients to reappraise their forthcoming surgery in more positive terms. For example, they were asked to reframe hospital stay as a welcome vacation. Patients receiving this cognitive treatment demonstrated more adaptive post-surgery adjustment as indicated by their reports of less anxiety, better coping, and fewer requests for anesthetics and analgesics than either a control or an information group.

Applying a coping skills strategy, Kendall, Williams, Pechacek, Graham, Sisslak, and Herzoff (1979) showed that CBT using stress inoculation and coping strategies could be effective in reducing anxiety and improving adjustment for patients undergoing a surgical catheterization procedure. In other studies, coping strategies and stress inoculation have included a variety of procedures including relaxation, distraction, imagery, and self-instructional training, in various degrees and combinations. In a study by Peterson and Shigetomi (1981) where children were the participants, four groups who were to receive medical surgery were compared: two CBT groups, one given coping skills training, relaxing imagery and practice in self-instructional training, and another given coping skills and modelling, a third group who was given just a modelling treatment, and the forth was a no-treatment control. The two CBT groups demonstrated better post-surgery adjustment on measures of anxiety and cooperation. In another experiment, Tan and Poser (1982) compared a CBT skills training group with two control groups on their stress

reduction effects on people given a difficult X-ray procedure. The CBT group was given skills training in relaxation, deep breathing, distraction, imagery, and self-instructional training.

Several studies have been conducted with CBT directly applied to treat the distress caused by dental treatments. Venham (1977) compared a television watching dental patient group with a control group, finding after treatment that the TV group had lower average heart rates and lower self-reported anxiety. Corah, Gale, and Illig (1979b) gave one group of dental patients taped relaxation instructions and another experimental group was allowed to play video ping-pong during their dental treatment. Both groups fared better than controls on several measures. Although included in a discussion of CBT research by Anderson and Masur (1983), there appears to be nothing about the treatment methods in these studies that distinguishes them from other treatment methods.

Nocella and Kaplan (1982) used a stress inoculation CBT treatment to prepare children for dental treatment. The CBT procedure involved an average of 15 minutes in order to give children skills in identifying stimuli that might trigger arousal, teach deep breathing exercises, and give exposure to positive self-talk. The children who received this training uttered fewer verbalizations and exhibited fewer body movements during subsequent dental treatment than did attention- and a no-treatment controls. In a study where an attempt was made to prepare adults for dental treatment, Akins, Hollandsworth, and O'Connell (1982) matched visual and verbal modes of treatment with respective preferences for patient's learning styles. One treatment group used an imagery-based coping style while another group was taught a self-instructional training coping strategy. Both treatments were found to be significantly more effective in reducing self-reports of discomfort, relative to a no-treatment control. However, they failed to show any significant interaction between the preferred mode of learning and the treatment effectiveness.

Hypnosis

The recorded history of the use of hypnosis in dentistry spans almost 1 1/2 centuries (Ross, 1981). Hilgaard and Hilgaard (1983) reported that the first instance of a tooth being

extracted with hypnotic anesthesia was performed by Oudet in 1837, five years before ether was reportedly used as an anesthetic for an extraction. Prior to the second world war there were only sporadic accounts, typically single case studies; in the literature on the use of hypnosis in dentistry. For example, Wallis (1883) discussed a case where *suggestion* was inadvertently given instead of nitrous oxide to successfully produce anesthesia. Langley (1885) discussed the physiological action involving pain inhibition with hypnosis. Also, Best (1930) discussed the benefits of using hypnosis with some dental patients.

According to Hilgaard and Hilgaard (1983) it wasn't until the second world war that many dentists began to use hypnosis with larger numbers of patients to produce analgesia. Because chemical anesthetics were not available in most locations, hypnosis was applied by many dentists from necessity. For example, hypnosis was successfully employed with 23 out of 29 patients in a prisoner-of-war camp in Singapore in 1945.

The use of hypnosis for analgesia became more common in the 1950's (Petrov, Traikov, Kalengiev, and Sharankov, 1964). Case histories for a variety of types were reported. For example, Heron (1951) used hypnotherapy to induce relaxation with dental patients. He claimed that training a patient to relax while in the dental chair was more important than inducing hypnoanalgesia. He argued that the time required to induce hypnoanalgesia and the uncertainty of its effectiveness are factors contraindicating its general use. Some of the earlier work where hypnotherapy was applied to dentistry was done by Burgess (1952). He actually developed an elaborate procedure and induction strategy of hypnosis to be used generally in a dental setting. Moss (1956) was the first to coin the term *hypnodontics*. Around the same time Chiappone (1956) reported the successful use of hypnosis involving dental surgery for a patient requiring the construction of dentures, and Marcuse and Phipps (1956) reported on demonstrations of two extractions performed while patients were anesthetized through hypnosis. Although the operations were carried out successfully, the authors claim that "pedagogical" conditions were far from ideal and therefore they were not entirely supportive of encouraging the general use of

hypnosis. Other case reports included one by Ament (1955) who used hypnotic anesthesia for a woman considered hysterical and who had incurred a previous traumatic experience with dentistry. Also, a case was reported by Stolzenberg (1955) where hypnosis was successfully applied for anesthesia, and hemorrhage and salivation control during oral surgery.

Probably the most extensive application of hypnosis to dentistry during the 50's decade was reported by Jacoby (1955). He tabulated the cases seen in a 2 year period where hypnosis was used for anesthesia. Jacoby (1955) included a description 197 cases and 776 appointments. Anxiety reduction was also a major focus of hypnotherapy for many of these cases. In some instances patients were prepared with a recording of relaxation hypnosis. Jacoby observed that only 8 of the 197 subjects could not reach at least a *hypnoidal* (light) stage of trance.

By the 1960's hypnosis was an established topic in the literature of dentistry. Sector (1960) wrote extensively on the removal of symptoms, such as gagging, that interfered with dental treatment. Despite a plethora of positive reports, the advancement of the use of hypnosis in dentistry didn't proceed without avid critics. For example, Borland and Epstein (1961), in their evaluation of hypnosis in dentistry, reported that most well-adjusted dentists tended not to use hypnosis and those who did also tended to take holidays often. They insinuated that the use of hypnosis stemmed from some dentist's insecurities. Gutwirth (1965) made the charge that hypnosis is controlling and emotionally harmful to the patient. These various claims of the deleterious effects of the uses of hypnosis have yet to be substantiated (Clarke & Jackson, 1983).

In the 1960's, despite some pointed criticism, the use of hypnosis spread in dentistry. Jacoby (1960) reported on 300 dental patients who were treated with hypnosis. He advocated the use of tape-recordings for the *conditioning* of dental patients. Many different hypnotherapeutic strategies were used by this time. For example, Stolzenberg (1961) had used an age regression technique to treat two dentally phobic patients. During this period of dental hypnosis research, Polish researchers had also begun to use and acknowledge the beneficial

effects of hypnotherapy for creating analgesia for, what they called, *stomatolocal* treatments (Petrov, Traikov, Kalengiev, & Sharankov, 1964).

Also in the 1960's there was more talk about the kinds of hypnotic inductions available to dentists. Previously only formal inductions and direct suggestions were used. Owens (1966) discussed formal inductions like *arm levitation* as well as more informal hypnotic inductions that serve to distract or redirect awareness. M. Erickson had, by this time, also discussed the importance of informal, less direct inductions for use with dental patients. Moreover, by this time there were in-depth descriptions of specific applications of hypnotherapy for dentistry. For example, Moss (1965) outlined the various applications of hypnosis in dentistry, including: patient relaxation for the elimination of tensions, anxiety, and fear of discomfort, changing maladaptive dental habits, anesthesia, analgesia, preventing gagging, and controlling bleeding. Also, Moss (1965) gave consideration to the distinction between directive and non-directive applications.

Pollack (1966) experimented on the relative effectiveness of two pain control treatments for dental patients. One group received suggestions that novocaine was entering a particular site while another group received a real topical anesthetic. The effectiveness of the suggestions led the author to conclude that suggestion is a crucial factor in pain control. This finding also coincided with Melzack and Wall's (1965) gate theory of pain, discussed in the previous section on the interaction of pain and fear. Despite the occasional report of a group comparison study, again, in the 1960's most reports were of single cases.

Chastain (1965) reported on the successful elimination of a gagging problem that had interfered with a patient receiving dental treatment. Similarly, a case of stopping the tongue-thrust habit of a dental patient was reported by Krowder (1965). Some extraordinary reports of the successful use of hypnotherapy during dental surgery with hemophiliacs was reported by Dufour (1960) and Lucas (1965). Also, the successful treatment of facial pain was claimed by Kehoe (1967).



Case study reports endured into the 1970's. The use of hypnosis for analgesia was extended. Bartlett (1970a) used hypnotherapy with analgesia suggestions to allow the non-anesthetic treatment of a patient who had a novocaine allergy. He commented that true chemical anesthetic allergies are extremely rare and that the patient he treated actually had a psychosomatic allergy. In another experiment Bartlett (1970b) also recommended the use of Erickson's (1961) strategies for hypnotherapy, including notions of indirection and permissiveness of language.

Tinkler (1971) asserted that 9 out of 10 dental patients could be helped by hypnosis. He argued that some patients were capable of experiencing deep trance, which can produce analgesia, others experience medium trance, and some pain, while those who experience light trance can feel more relaxed and comfortable. He outlined many of the same uses for hypnotherapy as earlier described by Marcus (1963). Yet another researcher, Kleinschmidt (1971), stated that 80% of patients could be helped with hypnosis. By this time there were many reports of hypnosis used to reduce dental patient's fears (Eg. Golan, 1971; McAmmond, 1971).

The interaction of dental patient's fear and pain was well understood and led to more attempts to reduce patient's fears. The recognition that hypnosis should be used to reduce patients fears and not just pain was expressed by Strosberg (1972). Similarly, Neiburger (1973) stated, "Clinically, a relaxed patient will not feel as much discomfort as an anxious, fearful patient." He reported on the use of a sensory confusion method of suggestion that incorporated the use of non-specific, non-anxiety producing language, a strategy resembling the hypnotherapy strategies of Erickson (1961).

Goldberg (1973) provided a comprehensive overview on the role of tension in the development of various dental problems and specific approaches for eliminating those problems. Hypnotherapeutic approaches to the treatment of bruxism was one of the areas discussed. A particular method mentioned involved hypnotizing patients and then giving suggestions to squeeze one fist while simultaneously recalling happy events and allowing the other fist to open,

letting unhappy events drop to the floor. It was assumed that way the patient could learn to contain happy events while letting go of unhappy events and gradually feel more comfortable and relaxed. The uses of hypnosis for reducing dental anxiety were reviewed by Schey (1976). This author charged that the therapeutic value of hypnosis was difficult to assess as the research had been limited to mainly case studies, rather than group comparison studies. He added that there is "an absolute lack of statistical research in evaluating the effects of hypnosis in dentistry in all of the reviewed literature." (p. 119) In conclusion, Schey (1976) suggested that hypnosis should be used mainly for fear reduction.

The challenge for more group outcome studies assessing the effectiveness of hypnotherapy in dentistry was soon met by Barber (1976). He reported on the remarkable success of a hypnotherapeutic procedure he called *Rapid Induction Analgesia* (RIA), which he used with dental patients in place of chemical anesthetic. He found that RIA could be effective with dental patients regardless of hypnotic susceptibility. RIA involved an individualized method of hypnotic induction where the patients were given indirect suggestions for relaxation and analgesia. Later Barber (1977) conducted a clinical study of 100 dental patients. The criterion for successful analgesia was to undergo dental treatment without chemical anesthesia. He reported the astounding success rate of 99 out of 100 having reached the criterion. Again, hypnotic susceptibility was neither assessed nor considered, and was obviously not a critical factor in the effectiveness of RIA. Cohen (1977) reported he had received two letters from dentists who had worked with Barber on the clinical study. They had used Barber's RIA method themselves subsequent to the study and reported experiencing highly positive results.

Barber's (1976, 1977) research seemed to instigate many group outcome and comparison studies. Snow (1979) used the RIA procedure to examine its effectiveness in reducing the pain of certain paraplegic subjects, finding a much less positive effect than that reported by J. Barber (1977). Similarly, Crowley (1980) found that a low percentage of a sample of patients undergoing minor podiatric surgery, obtained analgesic benefit from the RIA procedure.

New research on variables affecting the comfort of patients during dental treatment and on hypnotherapy, generally, was also undertaken. Katcher, Segal, and Beck (1984) compared the effects of five independent variables on the anxiety and discomfort of patients undergoing dental surgery. Treatment conditions included: having one group of subjects contemplate a nature poster, another group watch an aquarium, a combined poster/aquarium group, a combined aquarium/hypnosis group, a hypnosis group, and a control group. The standard induction hypnosis groups and the aquarium contemplation, alone group produced greater reductions of anxiety than the poster-contemplation and no-treatment control groups. That aquarium contemplation would be better treatment than poster contemplation and a no-treatment control couldn't be explained by the authors, although they described several delimiting aspects of the research. Cautions from Katcher, Segal, and Beck (1984) about interpreting the results included the possibility that, the various procedures, although not formally involving hypnosis, may have involved variable suggestion effects across the treatments. Another apparent problem with the study was the small number of subjects of each group. Only in the abstract of their article did the authors mention that 42 subjects were assigned to one of 5 treatment groups, apparently yielding just about eight subjects per group.

Direct and Indirect Hypnotherapy Approaches

J Barber's (1976, 1977) work stimulated controversy about the efficacy of indirect (often referred to as Ericksonian) compared with direct forms of inductions and suggestions in hypnotherapy. Yapko (1983) reviewed the hypnotherapy styles and considerations of, among others, Bandler and Grinder (1979), Erickson and Rossi (1981), Haley (1973), and Watzlawick, (1978), providing an appraisal of direct and indirect suggestion styles. He noted that rather than being considered all-or-none categories the direct and indirect styles could be considered on a continuum, neither one being at the extreme from a practical viewpoint. Direct suggestions, according to Yapko (1983) were ones having obvious connections with both the problem and the outcome desired by the clinician. This form of suggestion was considered to appeal more to

conscious processes, with the advantages that, for both the clinician and the client, there was a clear relationship between the treatment plan and problem. Some clients preferred to understand the reason for their change, and with direct suggestions they might feel more involved in the change process. Moreover, if change does occur for a given problem then the person might keep some of that ability to generalize to other problems, to apply a form of problem-solving ability to other problem situations. Another advantage to the direct method, from Yapko's (1983) analysis was that, with the client being more involved, the client and clinician share responsibility for therapeutic outcome.

Disadvantages of the direct approach were considered advantages of the indirect style. One important reason for selecting hypnosis as a treatment was to utilize resources from the powerful unconscious (Watzlawick, 1978). Direct suggestions would be less likely to go directly to the unconscious. Suggestions that were indirect consciously were considered to be more directly connected with unconscious processes, like those involving the individual's world view and self-image.

The more indirect style was viewed by Yapko (1983) as having "an indirect, covert relationship to the problem at hand and to the desired response sought by the clinician." (p.272) The assumption underlying the indirect style was that suggestions given indirectly appeal more readily to the unconscious mind. Therein lies the main advantage; indirect suggestions can bypass conscious awareness. Suggestions may be delivered via metaphor, or anecdote, thereby being less threatening, arousing less resistance while being more interesting and engaging. Furthermore the indirect style of delivering suggestions gave the client opportunity to project their own understanding, and reduced the chances that clinicians imposed their beliefs and values.

Disadvantages of the indirect style, from Yapko's (1983) analysis, included the possibility of alienating or distancing the client by offering suggestions which the client might consider unrelated to the problem. The therapist risks being mistrusted and losing leverage in therapy.

The author also mentioned that the use of indirect suggestion jeopardizes the client's welfare as there is an inherent lack of informed consent for the treatment. Moreover, there has been a potential imbalance of responsibility, leaving the client feeling a lack of control and frustrated, and the therapist burnt-out.

Finally, Yapko (1983) suggested, consistent with Zeig (1980) that a clinician can be more effective with hypnosis given skills in both direct and indirect styles, that an indirect approach is not necessary for those clients who will follow direct suggestions. Indirect suggestions should be offered when clients might be considered resistant or less responsive in therapy.

To reiterate, In 1965 Moss considered the difference between direct and indirect methods. Shortly thereafter, T. Barber (1969) also argued for the indirect method. He stated that indirect, permissively worded suggestions were more effective than those worded authoritatively. Later, came the clinical experiments like those of J. Barber (1976, 1977), previously cited. Continuing the trend, in another experiment comparing direct and indirect hypnotherapy techniques, Alman and Carney (1980) tested the effectiveness of each for producing a specific posthypnotic behavior. They found that a modified version of Barber's (1976) RIA method, an indirect approach, was more effective in producing a neck scratching response, particularly in females, than a version that was modified to be direct. They also found that the hypnotic susceptibility scores were not necessarily predictive of the posthypnotic responses of the indirect group, although for males there was a moderate ($r = .53$) correlation between the posthypnotic behavior and susceptibility scores. They concluded that those with low hypnotic susceptibility scores for direct inductions and suggestions can be responsive to hypnotic treatment and that therapists might have more effectiveness by using both indirect and direct styles.

Stone and Lundy (1985) employed 96 participants in an experiment to compare direct and indirect hypnotic suggestions in producing body movements in those who were either given a standardized induction or not. They found that the indirect wording resulted in more positive reactions to the body movement suggestions for the hypnosis condition, whereas there was

more response to direct suggestions in the non-hypnotic condition. The indirect result was predicted from an Ericksonian viewpoint where there would be expected less resistance to indirect suggestions. However, one would also expect in the non-hypnotic condition that the indirect suggestions would more likely have produced superior effects. The authors were puzzled by this result, and offered no explanation.

VanGorp, Meyer, and Dunbar (1985) studied the relative efficacy of direct compared to indirect hypnotic induction techniques on pain that was produced experimentally. Between 9 and 13 subjects were assigned to each of 5 groups. Conditions included: standard induction hypnosis, suggestion without hypnosis, Barber's (1977) rapid induction analgesia, progressive relaxation, and a no-treatment control. It is important to note that what these authors called an indirect induction, with regard to Barber's RIA method, was actually presented to the subjects via audio tape. The primary pain measure was a simple verbal report of pain on a 10-point scale. Subject's pulse rates were also used as dependent measures. Their results indicated that the greatest average pain reductions were gained by the group who were given the traditional hypnosis (standard induction) when treatment groups were compared to the no-treatment controls. The RIA group apparently did not show significant pain reductions.

Gillet and Coe (1984) compared J. Barber's (1977) RIA method with a shortened RIA procedure, that they called *short induction* (SI). They were concerned with the effectiveness of the RIA procedures on discomfort. They were also interested in the possible effects of both hypnotic susceptibility levels and dental procedure discomfort levels on hypnotic analgesia. Both the long RIA and shorter SI inductions were delivered to subjects on tape, based on Barber's (1977), RIA procedure. Like J. Barber's (1977) main dependent measure, the criterion for successful treatment was whether the patient received chemical anesthetic. Their results showed that 56.7% (17/30) subjects of the full, 23 minute RIA group didn't request anesthetic and 46.7% (14/30) of the SI group didn't make the request. Also important, there were no significant differences in hypnotic analgesia across hypnotic susceptibility levels. Even when the data were

reduced to comparisons of high and low susceptibility with high and low pain procedures, there was no relationship found between susceptibility and the request for anesthetic. However, the level of discomfort of a given procedure showed an effect on patient's responses to RIA.

Participants experiencing high discomfort procedures requested chemical analgesia more often than did those who were treated with low discomfort procedures. Not surprisingly, it was also found that chemical analgesia was more likely requested as the levels of discomfort of a procedure increased.

Gillett and Coe (1984) conceded that their study was not entirely an accurate replication of the approach taken by J. Barber (1977) mainly because a standardized, tape recorded version of RIA was administered rather than a more natural approach. They added that, "individual clinicians with more freedom of wording, timing etc... may indeed do better (or worse), but that is a question for future study." (p. 88) It should be stressed that the procedure of J. Barber's (1977) study also differed in that the patients were tested for analgesia just before the dental treatment by the dentist placing the "point of the explorer to the palate", and during the procedure, if the patient raised a hand to indicate a desire for anesthetic, the post-hypnotic cue was reintroduced. That is, if the patient requested anesthetic, then either the dentist or J. Barber would touch the patient on the shoulder to reactivate the post-hypnotic suggestion for comfort, relaxation, and analgesia. The patient was not automatically given anesthetic. In contrast, with Gillett and Coe's (1984) procedure the dentist provided the patient with chemical anesthetic after the first request. Gillett and Coe (1984) surmised that their initial rate of anesthetic request was actually lower than the approximately 70% rate reported by Barber (1977). Given the same procedure of reintroducing the post-hypnotic cue, Gillett and Coe's (1984) rate of successful induction of RIA might have been higher.

As mentioned in the introduction, Friction and Roth (1985) reported an experiment comparing the effectiveness of two kinds of hypnotic inductions on subject's pain thresholds to experimentally induced tooth pain. One induction technique was direct, providing an induction

by focusing each subject's attention on repetitious and direct suggestions. The other was indirect, based on Barber's RIA method with concern for naturalistic, permissive language, communicating with double binds, using symbolism and imagery, and implying that control over their experience rests with the individual subjects themselves. They found that the direct induction hypnosis method was effective in raising the pain thresholds of only highly susceptible subjects, whereas indirect-induction hypnosis was effective reducing pain thresholds of subjects, regardless of degree of suggestibility.

Employing 56 volunteer participants Woolson (1986) conducted a study to assess the differences produced by utilizing an Ericksonian/indirect scale of hypnotic susceptibility for participants given indirect suggestions, and comparing those susceptibility levels with those of participants who were given direct suggestions and a test of direct susceptibility (the Stanford Hypnotic Clinical Scale). He found that more of the indirect group participants achieved medium or high susceptibility levels, and that they tended to be less aware of their levels of trance. He cited research that revealed that individuals who were assessed to have low hypnotic susceptibility based on direct tests were subsequently more responsive to indirectly worded than directly worded suggestions. Specifically, Woolson (1986) cited Angelos (1978) who found that subjects given indirect suggestions for analgesia during a cold water immersion test reported less pain than did those given directly worded suggestions. Also, Alman (1979) was cited for the report that a posthypnotic suggestion for neck-scratching was more likely successfully carried through if the suggestion was indirectly worded.

Taped and Live Hypnotic Presentations

Previously mentioned, Jacoby (1960) reported on 300 dental patients who were treated with hypnosis and he advocated the use of tape-recordings for most of the presentations of inductions and suggestions. The issue of the comparative effectiveness of taped as opposed to live hypnotic presentations has been addressed occasionally in the literature. For example, Svorad and Lanc (1963) compared participants' body sway responses to recorded and live

presentation suggestions. They found that, regardless of presentation mode, the procedures produced comparable effects in eliciting the behavior. Similarly, T. X. Barber and Calverley (1964), in two separate experiments determined that the effects of recorded and live presentations of hypnotic suggestions were similar. In the first experiment they compared the suggestibility of 42 women who were given recorded suggestions with 42 women who were given suggestions orally. They found no appreciable differences of scores on 7 out of 8 items of the Barber Suggestibility Scale. One item, the hand-lock suggestion, was superior for the recorded suggestion group. In the second experiment 33 men in one group and 33 in another were compared, one given orally presented suggestions and the other recorded suggestions. Although the recorded presentation group showed some superiority in suggestibility on 2 of 8 items, overall there were no significant differences. They noted that the advantage of administering hypnosis via recordings was the ability to standardize the procedure, and concluded that there was sufficient justification to use recorded inductions and suggestions.

Certainly from an Ericksonian perspective, at least for developing initial trances, a live presentation would be considered preferable. For example, Gilligan (1987) wrote extensively on the importance of hypnosis being an interpersonal experience and the need to pace client's ongoing responses and experiences. Also, Woolson (1986) incorporated participants responses within the indirect/Ericksonian induction in his study, consistent with Erickson's principle of utilization. As he stated, "For instance, if eye flutter was observed during the procedure, the operator could comment, 'And as those eyelids continue to flutter you can find yourself going even deeper'." (p. 24).

Gillet and Coe (1984) and VanGorp, Meyer, and Dunbar (1985), as mentioned, replicated Barber's indirect method, but with audio-taped presentations of hypnosis rather than live, oral presentations. Gillet and Coe (1984) acknowledged that live presentations might have improved the effectiveness of the approach as applied in their study. Crasilneck and Hall (1985) asserted

that , "recorded suggestions cannot provide the careful attention of a therapist."(p. 65). They argued in favor of live hypnosis for clinical treatment.

Unusual Hypnotic Procedures

Various other procedures have been employed to augment or facilitate hypnotic inductions and responsiveness. Margolis (1966) used what he called a *brain wave synchronizer*, a device that emits a sound ostensibly at the same natural frequency of the brain, on an alpha frequency, which he claimed can reduce ones resistance to hypnosis. Morosko and Simmons (1966) used *audio-analgesia* a method of introducing music with a masking sound simultaneously, reducing anxiety and positively altering pain thresholds and tolerances. Neiberger (1973, 1976, 1978) has successfully employed a method he labelled *waking hypnosis* whereby clients were encouraged to reinterpret anxiety provoking stimuli as experiences that are relaxing and comfortable. In other novel uses of hypnosis, Morse (1977) has shown the effectiveness of hypnosis combined with meditation to reduce fear, tension, and pain, and control salivation during dental treatment. Also, nitrous oxide administration and hypnosis have been used together to provide dental patients with comfort, the nitrous oxide preparing the patient to be more responsive to hypnotic suggestions (DiBona, 1979).

Conclusions

Many non-intrusive, psychologically based interventions have been applied to reduce patients' distress during dental treatment. More extreme forms of distress, manifested by severe anxiety, phobia, and avoidant responses have found some relief from treatments of modelling, systematic desensitization, hypnosis, and cognitive-behavior therapy. Behavior modification treatments have typically been applied for controlling children, or other so-called difficult-to-manage patients. Preparing dental patients by early exposure to non-distressing dental visits has long been known to help prevent the development of intense dental fears. Equally important are dentists relationships with patients, as dentists have been implicated in both the development and alleviation of distress responses of patients, depending on their style of interaction.

Although clinical researchers have provided many non-intrusive procedures to eradicate and prevent dental patient's distress, obstacles have prevented routine applications. One criticism consistently given for procedures has related to the time and expertise required for their administration (Scott, Hirschman, & Schroder, 1984). Hence, the challenge for researchers is to develop and refine treatments that are reliable yet can be applied in short time periods by dentists or their staff. The proposed research is partly in response to this challenge, to examine brief, preparatory, hypnotherapeutic treatments that can be applied to mildly and moderately fearful dental patients, to alleviate their distress during dental treatment. The main practical question relates to the distress reducing effectiveness of brief hypnotherapy with dental patients. The questions of theoretical import relate to the comparative efficacy on two dimensions, one involving permissiveness or non-permissiveness, and the other comparing relatively personalized (live) with relatively non-personalized (taped). This follows, in part, the line of research begun by J. Barber (1976, 1977) and his studies on the RIA method.

Hypotheses

Following are the main hypotheses derived from research reviewed:

1. All experimental hypnotherapy treatment groups will show lower post-intervention levels of stress and discomfort than the no-treatment control group.
2. The indirectly worded and live hypnotherapy treatments will show superiority in effectiveness when compared with the control group. Conversely, the directly-worded induction, and taped presentation conditions will prove to be inferior to the the indirect and live conditions when compared with the control group.
3. Many of the variables will be interrelated so that: (a) early exposure to dental treatment will correspond with lower dental fear and distress, (b) previous dental trauma will correspond with higher levels of dental fear and distress, and (c) dental distress measures of fear and pain will show close correspondence, while measures of comfort will be negatively related to those distress measures.

In the next chapter the method that was used in order to investigate these hypotheses is described.

III METHOD

The method was selected to be consistent with the primary hypotheses, first that hypnotherapy is effective for preparing dental patients for dental treatment procedures, second, that indirect and live hypnotherapy conditions would be most effective, and, third, that many of the measures would be interrelated. Four hypnotherapy groups and a control group were compared on several measures of dental distress.

Design

The main design employed has been referred to as a randomized group design (Craig and Metze, 1986). The participants, 100 in number, were randomly assigned to 5 groups, which were compared on several dependent measures. All but one of the measures of the dependent variables were taken once only, following the participant's dental treatment. One crucial measure, the Corah Dental Anxiety Scale, was taken twice, a repeated measure that could be considered both a within-subject (pre-post) and between-subject (post only) variable. This particular measure was taken to select participants based on their pre treatment anxiety levels.

This randomized, group-comparison design is consistent with the designation of a true experimental design according to authorities in psychological and educational research (Campbell and Stanley, 1963).

Participants

One hundred, three participants took part in the experiment. Of the 103, a total of 100, 50 men and 50 women, were included in final analyses. One participant was omitted early in the experiment because she was on anxiolytic medication. Another two participants, the first two from the control condition, were omitted early in the study because the experimenter spent excessive time conversing with each person prior to their dental treatment. The time was considered to make them feel more relaxed. Therefore, control participants were left to wait on their own.

Each participants was recruited from a dentist's appointment list. They were informed of the general nature of the experiment and asked to participate if (a) they were at least 18 years of

age, (b) had moderate to high anxiety about dental treatment (measured as between 8 and 18, inclusive, on the Corah Dental Anxiety Scale - CDAS), (c) were not on anxiolytic medications, (d) were to have dental treatment involving the filling of one or more cavities, requiring anesthetic and drilling of one or more teeth, and (e) they consented to take part in an experiment where either hypnosis might be used to reduce distress associated with dental treatment, or they would just be asked a number of questions and monitored throughout their dental treatment. Each volunteered to take part, were introduced to the experiment (See Appendix I for introductions) and gave informed consent by acknowledging that they were given adequate explanation about the procedures (See Appendix II for Consent Form).

Assessment Measures

The main purpose of the experiment was to assess the effectiveness of preparatory hypnotherapy approaches for reducing dental patient's distress during their treatment. The construct *distress* was assumed to have dimensions including fear, pain, and discomfort, therefore corresponding measures had to be selected or devised. The next specifications relate to the dependent variables in categories of self-report measures, others' ratings, and a physiological index of distress.

Self-report Measures

The Corah Dental Anxiety Scale (CDAS; see Appendix III) was utilized as a primary self-report measure of individual's anxiety for dental treatment. The scale, mentioned in chapter I was described to have excellent reliability with a K-R, internal consistency correlation of .86 and test-retest reliability of .82. The CDAS was administered twice to each participant, once prior to their dental treatment and then immediately following dental procedures. The screening administration of the CDAS was done over the phone whereas the dependent measure was done with the dental patient, in person. This was the only repeated measure, administered as a pretest in order to select moderately to highly anxious dental patients, and to provide later control where pretest score differences might have biased outcome measures.

Participants were also administered the Dental Fear Survey (DFS; see Appendix X) after their dental treatment, as an additional self-report measure of anxiety. The measure was included as it provides more specific information as to the source of dental patient's anxieties, allowing for delineating anxiety into avoidance, physical, and cognitive dimensions. As additional measures, patients were asked to rate their pain, their fear, and their comfort during dental treatment on 10-point, likert-type rating scales (See Appendix IX for Patient's Rating Scale). The self-report measures discussed to this point, the CDAS, DFS, and ratings of pain, fear, and comfort, constitute components of the participant's own reports of dental distress.

Dental Personnel Ratings

Indices of each participant's distress were obtained from ratings by both the dentists and dental assistants involved (See Appendix VII and Appendix VIII, respectively, for Dentist's and Dental Assistant's Rating Scales). Estimates of levels of participant's pain intensities and comfort levels were gathered from ratings on each variable based on the participant's behavior while receiving dental treatment. The dentists' and dental assistants' ratings of pain and comfort were made on 10-point likert type scales. As another pain index, the amount of anesthetic required by each patient was recorded by the dentist.

Physiological measure

Galvanic skin response (GSR) measures were taken on each dental patient 5 times through their dental treatment. The device used for this measurement was a biofeedback instrument giving simultaneous reciprocal readings of conductance and resistance of the skin. Individuals normally experience higher conductance of the skin during times of distress as sympathetic nervous system activity is increased. Simply stated, most person's hands and fingers perspire more when they are feeling anxiety, pain, or other discomfort.

A baseline measure was taken 5 minutes after each participant was seated in the dental chair. Subsequent measures were taken at (a) the highest level during hypodermic injections of anesthetic, (b) the level during the first 10 seconds when drilling began, (c) toward the end of

drilling or 3-5 minutes after the onset of drilling, and (d) when the dental procedures were complete.

Additional measure

Several additional self- and other's- ratings were acquired from participants either prior to, or after, the dental procedure. Prior to their involvement participants were requested to complete the A-Trait scale of the Stait-Trait Anxiety Inventory. The Scale consists of 20 questions, yielding a measure of general, trait anxiety. A brief, dental history questionnaire was also given to each participant before their involvement; questions were asked about the time since their last dental treatment, their first encounter with a dentist, whether they experienced trauma in the chair, if they avoided going to the dentist in the past due to fear or lack of money, or whether they had ever considered any of their previous dentists' manners poor (See Appendix IV).

During hypnotherapy interventions the participants were rated by the experimenter on their depth of trance, generally following a 1-4 levels categorization based partly on the criteria outlined by Crasilneck and Hall (1985) and consistent with considerations made by Erickson and Rossi (1979). Criteria considered and corresponding levels were :1) Hypnoidal - fluttering of eyelids, some apparent physical relaxation, closing the eyes, apparent lethargy, 2) Light Trance - deep, slow breathing, relative motionlessness, deepening of lethargy, 3) Medium Trance - very slow breathing, face flaccid, deep relaxation, report after of deep relaxation or comfort, and 4) Deep Trance - lip pallor, passivity, head resting back or slumped, amnesia.

Other additional ratings included dentist and dental assistant ratings of cooperation as a reflection of patient's apparent willingness to follow instructions and directions while receiving dental treatment. As a measure of their enjoyment of the experience, those patients who were presented with a hypnotic induction were asked to rate their enjoyment on a 10-point scale. They were also asked to rate how forceful or pushy they considered the intervention to be, and asked to respond "yes" or "no" to a question asking if they would like the hypnotic intervention again before the next treatment.

The dental procedures were rated for their levels of intensity, an indication of the degree of distress the dental treatment would likely cause the average patient. Finally, dentists were asked to record the time taken for each client's dental treatment.

Procedure

Patients were administered the pre-test scales, including the consent form, the STAI, the CDAS and Dental History Questionnaire(DHQ) prior to their dental treatment. The CDAS and the DHQ were administered orally whereas the STAI was given to the participant to read and fill-in. Following this pretesting, the participants assigned to the control condition were asked to wait for their dental treatment. They usually waited 15 to 20 minutes. Participants of the hypnotherapy treatment conditions, depending on the group, were either presented a recording of a hypnotic induction, delivered from a portable tape-recorder, stereo headset, or presented with a live induction. As well as the live-taped differentiation, there was also a direct-indirect difference in the kind of induction. This direct-indirect discrepancy was well described by Friction and Roth (1985):

The indirect technique includes language that is individualized, natural, and is intended to be consistent with the needs of the subjects. Suggestions are constructed from close observation and understanding of the subject's perception of his or her own experience. The language utilizes the subject's experience and builds on it to create an acceptable experience. Characteristics of this technique include using permissive language, creating double bind communication (Erickson, 1964), using imagery and symbolic language, and implying control rests with the subject. An example of an indirect suggestion is "I wonder if you are surprised to notice that as you take a deep slow breath, you may notice the heaviness in your chest spread to other areas of your body. The direct technique used in this study, as well as in susceptibility tests and earlier studies by Hilgaard and others, uses the subject's focused attention and provided repetitive direct suggestions (Weitzenhoffer & Hilgaard, 1959). Frequently these suggestions imply that the hypnotist control the experience of the subject. An example of a direct suggestion is "your eyelids are getting heavier and heavier as you go deeper and deeper asleep." (p. 227)

Pilot Study

In order to field test the indirect-induction, live hypnotherapy treatment, a case study was undertaken. A thirty-four year old female dental patient requested from her dentist an alternative to local anesthesia, because she was reported to be allergic to local anesthetic and had abreacted during dental treatment several years previously. This abreaction included feeling nausea, vertigo, rapid breathing, and heart pounding during dental treatment. The patient was enthusiastic about hypnotherapeutic applications to reduce the distress of pain and anxiety and consented to such intervention for dental treatment. She had not received any dental treatment for 2 1/2 years. Early exposure to dental treatment was sometimes traumatic and she reported that both her parents expressed fears of getting dental treatment. This woman had been particularly upset as a child when dentists would lie to her and tell her that she would feel no pain.

For the pilot study, the patient was seen for four dental appointments over a one month period. The average duration of dental treatment per appointment was approximately 1 3/4 hours. The longest time was 2 1/4 hours. Dental treatment consisted of multiple fillings, many of which required drilling teeth well below the gum line. The dentist later commented that the fillings were among the deepest (one was the deepest) he had seen in at least 14 years of practice. The hypnotic intervention followed Barber's (1977) Rapid Induction Analgesia (RIA) method. This included a live hypnotherapy induction using most of the language and suggestions contained in Barber's (1977) sample procedure. Care was taken to ensure permissive language, correct timing of suggestions, use of imagery, and implying that control rested with the participant.

The patient was not given local anesthetic during the dental treatment. Toward the end of the last appointment part of one of her teeth collapsed within a clamp. As a result there was not enough tooth on which to secure the clamp and it was necessary to fasten it directly to the gum. The dentist then suggested a small amount of topical anesthetic and I agreed. Throughout the four dental appointments the patient did not request anesthetic, and, with the exception of the

collapsing tooth during the last session, she appeared comfortable, relaxed, and pain free. The dentist reported that, along with the analgesic benefits of the hypnosis, he noticed that the patient swallowed less often, there appeared to be less salivation, and he was able to complete procedures more efficiently, without interference. The patient reported that, although she had felt the pain during treatment, "it really didn't matter". After each appointment the patient was comfortable and relatively pain free for at least a few hours. It should be noted that following the first appointment the patient felt slightly drowsy and euphoric as though she had consumed a few alcoholic drinks. Her drive home was delayed and she was later accompanied home. During subsequent sessions this problem was remedied by giving suggestions for alertness immediately following the dental treatment.

This case study supported the claims of effectiveness of Barber's (1977) RIA method and confirmed the importance of live presentation and close replication of the method. For example, it appeared critical that the therapist offer, from time to time, the cue for the reinstitution of the post-hypnotic suggestion by placing a hand on the patient's right shoulder, or having the dentist briefly place a hand on the patient's shoulder.

As in the Friction and Roth (1985) study, both hypnotic induction methods included suggestions for relaxation and eye closure, progressing through the numbers 1 to 20 with deepening suggestions, suggestions for analgesia, and suggestions for returning to a more alert state. The groups and corresponding instructions were as follows: (See appendix II for verbatim instructions; The Indirect Live presentation was not identical for each participant in that group)

Group 1: Indirect Induction and Suggestion. Taped Presentation (IT) - This group was given a tape-recorded hypnotic intervention based on Barber's (1977) RIA method involving permissive language, double bind communication, symbolism and imagery, and implying that the participant controlled their own experience.

Group 2: Direct Induction and Suggestion. Live Presentation (DL) - This group was given a live hypnotic intervention of a standard hypnotic induction with direct suggestions to experience relaxation and comfort, analgesia, amnesia for the induction, and direct, post-hypnotic

suggestions to respond to the dentist's cue of putting a hand on the patient's shoulder, to then feel comfortable and relaxed. The standard induction was taken and adapted from one published by Hilgaard and Hilgaard (1983) as the Stanford Hypnotic Clinical Scale (SHCS).

Group 3: Indirect Induction and Suggestion, Live Presentation (IL) - Participants of this group were given the indirect induction described for the IT group, but presented in-person, directly with the individual, as done in the original RIA method by Barber (1977). The in-person delivery allowed for better pacing by watching for signs of relaxation and eye closure, so these reactions could be more accurately commented upon. Also, the timing of the induction was more consistent with the patient and each patient's responsiveness to the suggestions was observed and addressed if necessary. Efforts were made, where possible, to follow personal preferences, language style, and apparent representational channels (whether the patient used visual, auditory, or kinesthetic predicates).

Group 4: Control (C) - dental patients from this condition were asked questions and administered scales prior to and after their dental treatment. They were asked to wait 15 to 20 minutes for their dental treatment after pre-testing.

Group 5: Direct Induction and Suggestion, Taped Presentation (DT) - These participants were given the identical hypnotic intervention as the DL group except it was presented by tape recorder.

The experiment was undertaken with three dentists in two locations, although just one dentist was responsible for the treatment of 90% of the cases and 95 of 100 of the participants were treated in the same office. During the hypnosis procedures steps were taken to minimize sensory stimulation. The rooms were lit with single lamps with one bulb. The participants were seated in a comfortable seat and could rest their heads back. Occasionally outside sounds could be detected, although attempts were made to reduce any possibly distracting noise.

Time for the interventions were 20 to 23 minutes for each participant. The same experimenter presented all treatment conditions. Care was taken to ensure dentists and dental assistants were blind to the experimental conditions. After the preparatory treatments, within 5

minutes, each participant was led to the dental operatory and seated comfortably in the dental chair. After being seated, each participant was fitted on two fingers with velcro fastened sensors of the Galvanic Skin Response device, and then given verbal cues to again become comfortable. The dentist and assistant then appeared so as to begin dental treatment. Each participant was observed by the experimenter through critical stages of dental treatment, including anesthetic injection, initial drilling, and later filling procedures. Dentists were instructed as to how and where to provide physical (shoulder touching) and verbal post-hypnotic cues to reintroduce comfort and relaxation, and were encouraged to use them throughout the dental treatment. Dentists were requested to place their hand on the patients' shoulder at least three times in the course of dental treatment and to encourage relaxation with concomittant statements like "and you can just feel comfortable", especially at more critical times during the dental treatments, as when the patient reacted with a grimace or showed other signs of pain or fear. The dentists had no formal training in hypnotherapy. The hypnotist had graduate level training in hypnotherapy, including intermediate level training in Ericksonian approaches with practicum and internship exposure and experience.

Dental assistants and dentists were asked to complete brief rating scales on each dental patient as soon after the dental procedure as was convenient for them. The CDAS, the DFS, and patient rating scale were administered immediately following the dental treatment. Efforts were made to ensure each patient was alert and fully awake before leaving the office. They were informed that during subsequent visits, if they desired they would have access to a tape-recorded induction prior to their dental treatment.

Analyses

Initial analyses involved descriptive statistics of all participants taken together and each of the five groups separately. Groups were then compared on various pretest measures and observations using analysis of variance (ANOVA) and Chi-square statistical tests. These preliminary analyses were carried out to ensure that the groups did not differ on any critical measures before the pre-dental treatment preparation. The entire sample was described by averages, ranges, and standard deviations with respect to age, pre-treatment anxiety measured

by the CDAS and STAI, and time since their last dental treatment. Then the individual groups were compared on the same measures along with responses taken from the dental history questionnaire. Also, to ensure that the participants of the various groups were experiencing comparable intensities and durations of dental treatment, analyses were carried out comparing groups with rated intensities and times taken for dental treatment.

Subsequent analyses were consistent with questions from hypotheses of the experiment. Next is a specification of those questions with a description of the analysis employed to answer each.

1. Were the five groups comparable in their responses to questions of dental history?

Analyses: Crosstabulations and Chi-Squared analyses were carried out on the *yes* and *no* responses of each group of participants to four questions of dental history. The groups were compared on the responses.

2. Were the five groups comparable on other critical pre-intervention measures?

Analyses: Oneway analyses of variance were computed comparing the five groups on five separate continuous variables.

3. What were the relationships among both independent and dependent variables? For example, how did patient, dentist, and dental assistant ratings correspond?, did age at first visit correspond highly with any of the distress measures?, and were the various distress measures interrelated? Analyses: Pearson Product-Moment Correlation Coefficients of dependent and independent variables were carried out.

4. Do brief hypnotherapy interventions reduce the overall distress of dental patients?

Analysis: Multivariate Analysis of Variance (MANOVA) - The four hypnotherapy treatment groups and the control group were compared simultaneously on multiple dependent measures that made up the *distress* construct. The measures included the CDAS, DFS (avoidance, physical, and cognitive components), an overall, global estimate of their fear of dentistry, dentist and dental assistants' ratings of pain and comfort, participants' ratings of pain, fear, and comfort, amount of GSR increase, and amount of anesthetic required. The groups will be later compared on these

measures keeping dentist's ratings of intensity of the procedure, and time for the appointment constant, thereby a covariate (MANCOVA) designation in the analysis. Multivariate analyses have been suggested where multiple measures are incorporated so that interrelationships between dependent measures are included. Where several individual analyses are executed, there is greater probability of detecting significant differences among the groups by chance alone.

5. If the MANOVA reaches significance then the next question becomes, how do the four hypnotherapy treatment interventions compare on the individual measures of distress? Analyses: One-way analyses of Variance (ANOVA's) - Groups were compared on each dependent variable, and where significance levels were found appropriate, *a priori* contrast tests were also to be computed to contrast the means of the groups on each variable.

6. Combined, did the two direct hypnosis groups and the two indirect hypnosis groups differ from the control group on the distress measures? Analyses: identical MANOVA, ANOVA and contrast tests will be applied for this comparison as were applied to the comparison of the five groups in question 4.

7. Compared, did the two taped hypnosis groups and the two live hypnosis groups differ from the control group on the distress measures? Analyses: identical MANOVA, ANOVA and contrast tests were applied for this comparison as were applied to the comparison of the five groups in question 4.

8. Was there an interaction of sex with treatment. Analysis: ANOVA, and ANCOVA -- testing the effects of sex and group on the dependent variables making up the *distress* construct, as univariate effects.

9. What were the differential effects of the treatments on levels of trance and whether the participants would like the treatment again. Analyses: Chi-Squared analyses were computed comparing the four experimental groups with the control on the two measures. Also Chi-Squared tests were applied to compare combined groups on the two measures. The combined groups included the two direct and the two live, in comparison, and then the two combined live and the two combined recorded groups.

10. What were the effects of the hypnotherapy treatments on both (a) participants' enjoyment of the procedure and (b) how forced or "pushy" they considered the procedure to be.

Analyses: Oneway ANOVA's were performed to compare the four hypnotherapy groups on these measures.

In the comparative analyses the probability (alpha) level of .05 was designated. In this sense the comparisons were considered significant if, from the statistical tests, it was calculated that less than 5 out of one-hundred times the results would be achieved by chance. For correlational analyses the level, .01 was deemed the critical significance level, because the correlation tests were more powerful and the .05 levels would have allowed many, exceedingly low correlations to be considered within significance parameters.

IV RESULTS AND DISCUSSION

Description of Participants

The 100 participants were selected on the basis of CDAS scores, including only those who scored from 8 to 16, inclusive, representing moderately to highly dentally anxious subjects. The average CDAS score for all participants was 9.84. Another restriction was imposed so that there were an equal number of males and females in each group. The age range was 18 to 80 years, the mean being 36.5 years. Of 156 people approached, 53 either declined to become participants, or were outside the CDAS score criteria for inclusion. As previously mentioned, 103 dental patients were participants but only 100 were included in the final analyses. Three were excluded for reasons of treatment contamination.

The five groups were compared on several dimensions to ensure that they were equal before the pre-dental treatment preparations. First, Chi-Square tests were performed to examine the possibility that any of the groups differed initially on questions related to dental history. "Yes" or "No" responses were made to the following four questions relevant to history of dental anxiety:

1. Did you receive dental treatment on your first visit to the dentist?
2. Have you had any previous awful experiences while receiving dental treatment?
3. Have you previously avoided dental treatment due to fear ?
4. Have you ever received dental treatment from a dentist whose manner you considered poor?

The responses are summarized in Table 1 (See Appendix VI). None of the groups differed significantly in response to any of the four questions related to dental history. The largest discrepancy, observed between indirect live and control groups in response to question #3, indicated that there were many more participants of the indirect live group than the control group who had previously avoided dental treatment due to fear (12 compared with 6). However, again this difference was not found to be statistically significant.

Oneway analyses of variance (ANOVA's) were executed on several variables measured before the preparatory treatment: age, age when the individual first visited a dentist, time since their last appointment, trait anxiety (STAI) and pre-measured CDAS (Corah Dental Anxiety Scale) scores were analyzed by comparing the five groups of participants on the measures. The analyses, summarized in Tables 2, 3, 4, 5, and 6 (see Appendix VII) failed to show any significant differences with respect to age, $F(4,78) = .803$, $p = .659$; age at first visit, $F(4,78) = .8028$, $p = .527$; Time since last dental visit, $F(4,95) = 1.277$, $p = .285$; pre-CDAS, $F(4,95) = 1.857$, $p = .124$; and the trait anxiety measure (STAI), $F(4,95) = 1.857$. Comparability on these pre-intervention measures decreased the chances that any observed differences during and after dental treatment resulted from a factor other than the varying group preparatory conditions.

Hypnotherapy Treatment Main Effects

The five groups, including a control and four hypnotherapy groups, were compared to determine if they differed on 14 measures of distress. A multivariate analysis of variance (MANOVA) was employed for this purpose. Box's F test, the most versatile test of homogeneity of dispersion matrices, yielded an F value of 1.38, that, with 420 and 15778 degrees of freedom was significant at less than the .01 level. This indicates a lack of homogeneity of the variance-covariance matrices, which are pooled to form the error term used in MANOVA. Examining the determinants of the error sources indicated in Table 7 showed that the control group was an outlier. An outlier error source serves to bias the error term in the direction of the outlier group, therefore a conservative MANOVA was suggested (Barker and Barker, 1984).

Table 7. Logs of Determinants from Within-Groups Error Sources

Group	Log of Determinant
Indirect Taped	1.129
Direct Live	4.989
Indirect Live	5.776
Control	11.057
Direct Taped	5.693

A one-way multivariate analysis of variance (MANOVA) produced four test criteria (see Table 8). All four indicated significance at less than the .05 level. This level of agreement on all four test criteria suggested that the five groups of dental patients differed significantly in their levels of distress resulting from the dental treatment.

Table 8. Group Effect: Multivariate Tests of Significance (S = 4, M = 4, N = 40)

Test Name	Value	Approximate F	Hypothesis DF	Error DF	Significance of F
Pillais	.7432	1.3854	56.00	340.00	<.05
Hotellings	.9904	1.4237	56.00	322.00	<.05
Wilks	.4263	1.4056	56.00	321.14	<.05
Rois	.3376				<.05

Because the preliminary MANOVA results were significant, it was considered justifiable to test each separate dependent variable with univariate analyses. Table 9 summarized the ANOVA's carried out separately on the 14 variables measuring components of the distress construct.

Table 9. Summary of Univariate Analyses of Variance on 14 Dependent Variables

Variable	Treatment MS	Error MS	F	Significance of F
Post-CDAS	28.5100	6.1242	4.6553	.001
DACom	7.2350	6.6574	1.0868	.184
DAPain	4.2000	4.1890	1.0026	.205
DFSav	3.4750	1.5037	2.3110	.032
DFSphys	64.6400	14.7811	4.3732	.002
DFSiq	2.5500	.9874	2.5826	.021
DFS cog	492.4850	105.7253	4.6582	.001
Meds	1.1799	1.5829	.7454	.282
DentCom	5.9650	2.8663	2.0811	.045
DentPa	5.3750	3.4026	1.5797	.093
PaComf	8.8850	4.6595	1.9069	.058
PaPain	5.5850	3.5990	1.5518	.087
PaFear	4.9100	5.6732	.8655	.244
GSRD	96.7350	28.3947	3.4068	.006

*one-tailed

Of the 14 ANOVAs, 7 were found to be significant at less than the .05 level. Multiple comparisons of means tests involving *a priori* contrasts were then performed on each of the variables that were found to be significant. Table 10a summarized the means and standard

deviations of the Post-CDAS measures for each group. The indirect live group had the lowest Post-CDAS scores. Table 10b summarized the contrasts for the post-CDAS measure. It can be seen that all four hypnotherapy groups differed significantly from the control group on the after treatment CDAS scores.

Table 10a. Summary of Means and Standard Deviations of the Post Corah Dental Anxiety Scale Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	8.000	2.152
Direct Live	20	7.750	2.731
Indirect Live	20	6.650	2.301
Control Group	20	9.950	2.481
Direct Taped	20	7.850	2.661

Table 10b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Post Corah Dental Anxiety Scale Scores

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	.7344	2.655	37.3	0.012
Direct Live	.8251	2.666	37.7	0.011
Indirect Live	.7566	4.362	37.8	0.000
Direct Taped	.8135	2.581	37.8	0.014

Table 11a and 11b summarized the same information for the Dental Fear Survey, Avoidance measure. Only the two indirect groups differed significantly from the control group on this variable.

Table 11a. Summary of Means and Standard Deviations of the Dental Fear Survey, Avoidance Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	2.350	.9333
Direct Live	20	2.500	.7609
Indirect Live	20	2.250	.9105
Control Group	20	3.250	1.6182
Direct Taped	20	2.900	1.6190

Table 11b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Avoidance

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	.4177	2.155	30.4	0.039
Direct Live	.3998	1.876	27.0	0.072
Indirect Live	.4152	2.409	29.9	0.022
Direct Taped	.5118	.684	38.0	0.498

All four groups differed significantly from the control on the Dental Fear Survey physical measure as indicated by Tables 12a and 12b. The two indirect groups, again fared best, showing the lowest physical responsiveness scores on the DFS scale.

Table 12a. Summary of Means and Standard Deviations of the Dental Fear Survey, Physical Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	9.850	2.961
Direct Live	20	10.400	4.032
Indirect Live	20	9.450	3.663
Control Group	20	13.950	4.513
Direct Taped	20	10.450	3.886

Table 12b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Physical

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	1.2069	3.397	32.8	0.002
Direct Live	1.3531	2.624	37.5	0.013
Indirect Live	1.2997	3.462	36.5	0.001
Direct Taped	1.3317	2.628	37.2	0.012

The hypnotherapy preparation groups also differed on the singular, main fear question of the Dental Fear Survey as seen from the summary of statistics in Tables 13a and b. All but the direct taped hypnotherapy group contrasted with the control group.

Table 13a. Summary of Means and Standard Deviations of the Dental Fear Survey, Fear Question Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	1.650	.6708
Direct Live	20	1.950	1.0501
Indirect Live	20	1.850	.9881
Control Group	20	2.600	.9403
Direct Taped	20	1.950	1.2344

Table 13b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Fear Question

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	.2583	3.678	34.4	0.001
Direct Live	.3152	2.062	37.5	0.046
Indirect Live	.3050	2.459	37.9	0.019
Direct Taped	.3470	1.873	35.5	0.069

Table 14 a and b show the means, standard deviations, and contrast summaries for the Dental Fear Survey, Cognitive responsiveness portion. Three of the groups, excluding the direct live group, contrasted significantly with the control group.

Table 14a. Summary of Means and Standard Deviations of the Dental Fear Survey, Cognitive Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	23.80	7.696
Direct Live	20	29.00	11.526
Indirect Live	20	24.40	9.660
Control Group	20	36.05	10.817
Direct Taped	20	26.55	11.237

Table 14b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dental Fear Survey, Cognitive Measure

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	2.9683	4.127	34.3	0.000
Direct Live	3.5344	1.995	37.8	0.053
Indirect Live	3.2427	3.593	37.5	0.001
Direct Taped	3.4875	2.724	37.9	0.010

On the Dentists' ratings of patient's comfort level during dental treatment (DentCom), one group was rated significantly higher in comfort than the control group. In this case it was the indirect taped hypnotherapy group. Statistics were summarized in Tables 15a and b.

Table 15a Summary of Means and Standard Deviations of the Dentist's Ratings of Comfort Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	8.55	.9445
Direct Live	20	7.70	1.5252
Indirect Live	20	7.85	1.4609
Control Group	20	7.10	2.2688
Direct Taped	20	7.40	1.9574

Table 15b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on Dentist's Ratings of Comfort

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	.5459	-2.639	25.4	0.014
Direct Live	.6113	-0.982	33.3	0.333
Indirect Live	.6034	-1.243	32.4	0.223
Direct Taped	.6700	-0.448	37.2	0.657

The final measure from the univariate analyses of variance that reached statistical significance when comparing the five groups was skin conductance increase (GSRD). Table 16a and b provide summary information showing that the direct live and the indirect live groups contrasted significantly from the control group.

Table 16a. Summary of Means and Standard Deviations of the GSR Difference Measure of Each Group

Group	N	Mean	Standard Deviation
Indirect Taped	20	5.050	4.6166
Direct Live	20	4.100	3.8375
Indirect Live	20	3.250	3.0758
Control Group	20	7.600	4.6837
Direct Taped	20	8.300	8.6335

Table 16b. Summary of Contrasts (t-tests) of Control Group with Treatment Groups on GSR Difference

Contrast(Control with)	Standard Error	T Value	DF	T Probability
Indirect Taped	1.4705	1.734	38.0	0.091
Direct Live	1.3539	2.585	36.6	0.014*
Indirect Live	1.2529	3.472	32.8	0.001**
Direct Taped	2.1963	-0.319	29.3	0.752

To summarize, the MANOVA showed that when the 14 dependent variables comprising the distress construct were combined, the four hypnotherapy treatment groups differed significantly from the control group at a level of less than .05. Univariate analyses revealed that the groups were significantly different on 7 of 14 variables.

Covariates

Two measures, time for appointment (APTTime) and dentists' ratings of the intensity of dental treatment (DentRI) were included to ensure that the five groups had similar dental treatment. The measures were moderately correlated ($r = .60$), presumably because more intense

procedures tend to take more time. For example, deep fillings or multiple fillings would naturally require more time to treat than small or single fillings. Measures of dentists' ratings of the intensity of the dental treatments (DentRI) were found to be significantly discrepant across the five groups with $F(4,95) = 3.32, p = .013$. (two-tailed). As well, the time for appointment measures (APTime) were found to differ among the five groups, although not quite reaching two-tailed statistical significance at the .05 level, with $F(4, 95) = 2.09, p = .088$. Both these measures were used as covariates, first the APTIME alone and then simultaneously with DentRI, in both multivariate analyses of covariance (MANCOVA) and univariate analyses of covariance. (ANCOVA) Allowing these measures to covary lead to the means of the dependent variables being adjusted for the effects of the covariate measure(s). In this sense, statistically, the effects of group membership were analyzed on the dependent variables while the effects of the covariate factors were held constant.

Covariance Analyses

The MANCOVA with APTIME as a covariate, conducted on the same 14 dependent variables that were included in the MANOVA, resulted in significant multivariate group effects summarized in Table 17 (See Appendix XI). The univariate, ANCOVA, effects were summarized in Table 18 (See Appendix XII). It can be seen in Table 17 and 18 that the inclusion of the covariate enhanced the statistical significance of the multivariate and univariate tests, although the particular individual variables were the same.

There was some advantage to adding *dentists' ratings of intensity* as another covariate. The extra covariate resulted in all multivariate tests reaching significance at less than .01 and added significance to the univariate tests of variables previously found to differ among the groups. The most important additional change was that patients' ratings of their own pain during the dental treatment reached statistical significance with the double covariate ANCOVA.

Conclusions of Main Effects Utilizing MANOVA and ANOVA Tests of Significance With and Without Covariates

The MANOVA showed that when the 14 dependent variables comprising the distress construct were combined, the four hypnotherapy treatment groups differed significantly from the control group at an alpha level of less than .05. Univariate analyses revealed that the groups were significantly different on 7 of 14 variables. Table 19 illustrated the significant ANOVA's and *a priori* contrasts.

Table 19. ANOVA's, Probabilities, and Significant Contrasts of Seven Significant Variables

Variable	Overall F	Significant Contrasts
Post - CDAS	4.6553 p = .0009	Control > Indirect Taped Control > Direct Live Control > Indirect Live Control > Direct Taped
DFSavoidance	2.3110 p = .0317	Control > Indirect Taped Control > Indirect Live
DFSphysical	4.3732 p = .0014	Control > Indirect Taped Control > Direct Live Control > Indirect Live Control > Direct Taped
DFSfear question	2.5826 p = .0210	Control > Indirect Taped Control > Direct Live Control > Indirect Live
DFS cognitive	4.6582 p = .0009	Control > Indirect Taped Control > Indirect Live Control > Direct Taped
Dent Rating of Comfort	2.0811 p = .0447	Control < Indirect Taped Indirect Taped > Direct Live
GSR rise	3.4068 p = .0060	Control > Direct Live Control > Indirect Live Direct Taped > Indirect Live

The main group differences were based on measures of anxiety and fear rather than anxiety, fear and pain, as the univariate analyses showed that none of the pain ratings was affected at this point. The indirect groups outnumbered the direct groups 13 to 7 in accounting for contrasts, whereas there was no appreciable difference between live and taped groups, numbering nine and ten respectively, when the number of times the groups were significantly contrasted with the control group were summed.

When the covariate *time for appointment* was introduced to the MANOVA and ANOVA results, the effect was to decrease alpha levels, making the hypothesis of significant differences even more tenable. Allowing two variables to covary not only contributed more to the group differences on the multivariate and 7 previously noted significant univariate differences, but the two covariates resulted in an additional variable gaining statistical significance. Next, the combined taped and combined live groups comparison with the control group were reported. As well, comparisons between combined direct and combined indirect groups and controls were provided.

Combined Group Analyses

Combined taped-presentation groups and combined live-presentation groups compared with controls

A MANCOVA was undertaken comparing these three groups while allowing Appointment Time and Dentists' Ratings of Comfort to covary. Multivariate tests of significance were summarized in Table 20 and univariate results in Table 21. It can be seen that the differences were highly significant favoring the treatment groups and that 7 variables reached significance in the univariate case. Again, these variables reflected primarily anxiety measures. Table 22 summarized the contrasts of groups on the significant univariate results.

Table 20. Group Effect: Multivariate Tests of Significance on Combined Presentation Modes' Groups and Control Group With Appointment Time and Dentist's Ratings of Intensity as Covariates (S = 2, M = 5 1/2, N = 41)

Test Name	Value	Approximate F	Hypothesis DF	Error DF	Significance of F
Pillais	.4684	1.857	28.00	170.00	<.01
Hotellings	.6600	1.956	28.00	166.00	<.01
Wilks	.5758	1.907	28.00	168.00	<.01
Roys	.3374				<.01

Table 21. Summary of Univariate Analyses of Covariance on 14 Dependent Variables With Appointment Time and Dentist's Ratings of Intensity as Covariates

Variable	Treatment MS	Error MS	F	Significance of F*
Post-CDAS	50.8575	6.1250	8.3033	.000
DACorn	7.6200	6.6613	1.1439	.162
DAPain	6.1500	4.1490	1.4823	.116
DFSav	5.1250	1.5103	3.3933	.019
DFSphys	122.9675	14.6064	8.4187	.000
DFSfq	4.6000	.9773	4.7068	.006
DFS cog	841.3575	106.5064	7.8996	.001
Meds	.6391	1.5858	.4030	.335
DentCom	5.2050	2.9459	1.7669	.088
DentPa	6.7875	3.4142	1.9880	.072
PaComf	15.4575	4.6111	3.3523	.020
PaPain	10.1450	3.5459	2.8611	.031
PaFear	8.5575	5.5822	1.5330	.111
GSRD	37.0450	28.9727	4.7302	.006

*one-tailed

Table 22 ANOVA's, Probabilities, and Significant Contrasts of Eight Significant Variables

Variable	Overall F	Significant Contrasts
Post - CDAS	8.3033 p = .0005	Control > Combined Taped Control > Combined Live
DFSavoidance	3.3933 p = .019	Control > Combined Live
DFSphysical	8.4187 p = .0002	Control > Combined Taped Control > Combined Live
DFSfear question	4.7068 p = .0056	Control > Combined Taped Control > Combined Live
DFS cognitive	7.8996 p = .0004	Control > Combined Taped Control > Combined Live
Pa rating of Comfort	3.3522 p = .0200	Control < Combined Live
Pa rating of Pain	2.8611 p = .0310	Control > Combined Taped
GSR rise	3.4068 p = .0060	Control > Combined Live Combined Taped > Combined Live

With the combined groups' analyses the two variables, Patient's rating of their own comfort and patient's ratings of their own pain were found to be significant, whereas with the individual analyses dentists' ratings of comfort (DentCom) were found to differ across groups. Table 22 also showed that combined live groups were superior on three variables compared to the combined-taped group's superiority on just one.

Combined direct-style hypnotherapy groups and combined indirect-style hypnotherapy groups compared with controls

As with the previous analysis a MANCOVA was undertaken comparing these three groups while allowing APTIME and DentRI to covary. Multivariate tests of significance were summarized in Table 23 and univariate results in Table 24. It can be seen that the differences were highly significant favoring the treatment groups and that 10 variables reached significance in the univariate case. Consistent with individual groups and combined presentation groups, these difference variables reflected primarily anxiety measures, although two of the three pain indices, dental assistants (DAPain) and patient's ratings (PaPain) reached significance at the .05 level. Table 25 summarized the contrasts of groups on the significant univariate results and revealed relative superiority of the Combined Indirect Group which contributed to all 10 contrasts, exclusively responsible for 6 of them.

Table 23. Group Effect: Multivariate Tests of Significance on Combined Direct, Indirect and Control Groups With Appointment Time and Dentist's Ratings of Intensity as Covariates ($S = 2$, $M = 5 \frac{1}{2}$, $N = 41$)

Test Name	Value	Approximate F	Hypothesis DF	Error DF	Significance of F
Pillais	.4447	1.695	28.00	166.00	<.05
Hotellings	.6354	1.838	28.00	162.00	<.05
Wilks	.5902	1.767	28.00	164.00	<.05
Roy's	.3431				<.05

Table 24. Summary of Univariate Analyses of Covariance on 14 Dependent Variables With APTIME and DentRI as Covariates: Direct, Indirect, and Control Groups

Variable	Treatment MS	Error MS	F	Significance of F*
Post-CDAS	55.5329	6.0215	9.2225	.000
DACom	13.8648	6.5966	2.1018	.060
DAPain	10.9785	3.8987	2.8159	.033
DFSav	6.5297	1.4954	4.3666	.008
DFSphys	157.7117	13.7347	11.4827	.000
DFSiq	6.4032	.8996	7.1177	.001
DFScog	1172.0206	94.4335	12.4111	.000
Meds	2.5602	1.3709	1.8676	.080
DentCom	10.5018	2.8841	3.6413	.015
DentPa	6.0294	3.4976	1.7238	.092
PaComf	14.8758	4.6024	3.2322	.022
PaPain	10.6361	3.4445	3.0879	.025
PaFear	9.3312	5.6481	1.6521	.099
GSRD	75.6910	30.4513	2.4856	.045

*one-tailed

Table 25 ANOVA's, Probabilities, and Significant Contrasts of Nine Significant Variables

Variable	Overall F	Significant Contrasts
Post - CDAS	7.7354 p = .0008	Control > Combined Indirect Control > Combined Direct
DAPain	2.8159 p = .033	Control > Combined Indirect
DFSavoid	4.0934 p = .009	Control > Combined Indirect
DFSphys	8.8641 p = .0002	Control > Combined Indirect Control > Combined Direct
DFSfear question	5.0456 p = .0041	Control > Combined Indirect Control > Combined Direct
DFScog	9.1473 p = .0001	Control > Combined Indirect Control > Combined Direct
Dent Comfort	3.6413 p = .015	Control < Combined Indirect
Pa rating of comfort	3.3522 p = .020	Control < Combined Indirect
Pa rating of Pain	2.779 p = .025	Control > Combined Indirect
GSR rise	2.4856 p = .045	Control > Combined Indirect

Correlational Analyses

The degree of correspondence among dependent variables was measured using the Pearson Product Moment Correlation method. Each continuous dependent variable was correlated with each other to produce a correlation coefficient and a significance level for the calculation of correspondence. The correlation coefficients were considered in relation to various predictions about the interrelationships among the variables, to check the validity of measurements, and to ensure that the variables that seemed to comprise the construct *distress* were, in fact, intercorrelated thereby justifying the need for multivariate analyses. Tables 26 a, b, c, and d contain the Pearson correlation coefficients of each variable with each other variable. Significant coefficients are depicted in bold print. Next, just after table 26a, is a list of the abbreviations for the correlated variables and their meanings.

Table 26a. Pearson Correlation Coefficients of All Variables

	Age	Age First	Pre-CDAS	Post-CDAS	DACom	DAPain
Age	.	.30*	-.09	.03	-.12	.08
Age First		.	-.03	-.10	-.17	.06
Pre-CDAS			.	.57**	-.37**	.27*
Post-CDAS				.	-.45**	.29*
TimeSLV	-.00	.18	.17	.09	.01	-.12
DACo-op	-.10	-.27*	-.13	-.26*	.56**	-.17
DFSav	-.09	-.02	.34**	.45**	-.17	.15
DFSphys	-.18	-.15	.30*	.61**	-.35**	.22
DFScoog	-.16	-.15	.48**	.74**	-.47**	.35**
DFSsq	-.12	-.11	.41**	.63**	-.42**	.36**
DentRI	-.01	-.01	.06	.01	-.04	.12
AptTime	-.01	.00	.10	.11	-.10	.23
Meds	.10	.02	.19	.15	-.32**	.56**
DentCo-op	.05	-.04	-.27*	-.46**	.58**	-.55**
PaEnjoy	-.33*	-.26*	.21	-.02	-.08	.15
PaComf	.03	.12	-.35**	-.60**	.48**	-.19
PaFear	-.11	-.20	.36**	.63**	-.37**	.23*
PaPain	-.01	-.04	.16	.37**	-.44**	.54**
TRANx	-.16	.00	.29*	.07	-.18	.15
GSR1	-.42**	-.21	.05	.00	-.06	-.04
GSR3	-.40**	-.20	.13	.22	-.20	.06
GSR4	-.43**	-.20	.15	.25*	-.21	.09
GSR5	-.43**	-.21	.21	.22	-.15	.06
GSRD	-.18	-.01	.18	.38**	-.32**	.19
DentCom	-.10	-.01	-.24*	-.36**	.57**	-.58**
DentPa	.14	.04	.24*	.32*	-.64**	.63**
TranLev	-.12	-.14	.10	-.05	.04	.08

*p<.01

**p<.001

Abbreviation Meanings

Age - Age in years at the time of dental appointment.
 Age First - Age when the participant first visited a dentist.
 Pre-CDAS - CDAS scores prior to intervention and dental treatment.
 Post-CDAS - CDAS scores taken after dental treatment.
 TimeSLV - Time since dental patient last visited a dentist or hygienist.
 DACo-op - Dental Assistants' ratings of patients' co-operation during treatment.
 DFSav - Avoidance portion of DFS (dental fear survey).
 DFSphysy - Physical symptoms portion of DFS.
 DFS cog - Cognitive portion of DFS.
 DFSiq - Question of DFS rating patients' overall fear of dentistry.
 DentRI - Dentists' ratings of the intensity of the procedure.
 AptTime - Time required for the appointment: from sitting in chair to getting up.
 Meds - Amount of anesthetic required.
 DentCo-op - Dentists' ratings of patients' co-operation during treatment.
 PaEnjoy - Patients' ratings of their enjoyment of hypnotic intervention.
 PaComf - Patients' ratings of their comfort levels during dental treatment.
 PaFear - Patients' ratings of their fear levels during treatment.
 PaPain - Patients' ratings of the intensity of pain experienced during treatment.
 TRAnx - Trait anxiety portion of the Stai measured prior to any intervention.
 GSR1 - Baseline GSR measure taken 5 to 10 minutes after patient seated in chair.
 GSR2 - GSR measure taken during anesthetic injection.
 GSR3 - GSR measure taken at onset of drilling tooth.
 GSR4 - GSR measure taken 5 minutes after drilling onset.
 GSR5 - GSR measure taken when dental treatment just completed.
 GSRD - A measure of any increase in GSR from baseline to highest rise in GSR.
 DACom - Dental assistants' ratings of patients' comfort level during treatment.
 DAPain - Dental assistants' ratings of patients' highest pain intensity level.
 DentCom - Dentists' ratings of patients' comfort level during treatment.
 DentPa - Dentists' ratings of patients' highest pain intensity level.
 TranLev - Experimenters estimations of patients' trance levels after inductions.

Table 26b. Pearson Correlation Coefficients of All Variables

	TimeSLV	DACo-op	DFSav	DFSphys	DFScog	DFSiq	DentRI
TimeSLV	.	-.04	.09	.09	.17	.15	-.14
DACo-op	.	.	-.07	-.20	-.30*	-.35**	-.05
DFSav	.	.	.	.43**	.51**	.47**	-.05
DFSphys	.	.	.	.	.75**	.58**	.06
DFScog	.	.	.	.	.	.82**	.00
DFSiq	.	.	.	.	.	.	.03
AptTime	-.13	-.06	.04	.15	.19	.20	.60**
Meds	.00	-.05	.22	.24*	.27*	.28*	.25*
DentCo-op	.00	.32*	-.33**	-.41**	-.48**	-.40**	-.08
PaEnjoy	-.10	.01	.09	.02	.19	.18	-.05
PaComf	-.11	.33**	-.28*	-.57**	-.62**	-.59**	.10
PaFear	.24*	-.28*	.38**	.65**	.68**	.59**	.07
PaPain	-.01	-.10	.18	.45**	.45**	.34**	-.09
TRAnx	.07	.06	.13	.02	.12	.11	-.01
GSR1	.03	-.04	.01	.12	.08	.04	.03
SR2	.02	-.07	.11	.23	.22	.14	-.01
GSR3	.01	-.01	.16	.25*	.23	.13	-.03
GSR4	.02	-.02	.19	.27*	.26*	.15	-.02
GSR5	.01	.03	.18	.25*	.24*	.13	-.10
GSRD	-.00	-.03	.26*	.27*	.30*	.17	-.09
DentCom	-.01	.26*	-.31*	-.34**	-.45**	-.34**	-.04
DentPa	-.01	-.36**	.12	.31*	.43**	.38**	.02
TranLev	.06	-.01	-.06	.07	.05	.08	.03

*p<.01

**p<.001

Table 26c. Pearson Correlation Coefficients of All Variables

	Apt Time	Meds	DentCo-op	PaEnjoy	PaComf	PaFear	TRAnx
Apt	.	.35**	-.10	.01	-.03	.06	-.02
Meds	.	.	-.53**	.18	-.11	.18	-.04
DentCo-op	.	.	.	-.11	.40**	-.34**	-.01
PaEnjoy	.	.	.	.	.02	.06	.04
PaComf	.	.	.	.	.	-.59**	-.07
PaFear	.	.	.	.	.	.	.03
PaPain	.09	.44**	-.51**	.13	-.40**	.44**	.05
GSR1	.10	-.03	.08	.30*	-.07	.02	.10
GSR2	.03	-.02	-.07	.27*	-.18	.14	.07
GSR3	.01	-.02	-.07	.22	-.22	.15	.11
GSR4	.04	.01	-.11	.26	-.21	.17	.14
GSR5	.01	.00	-.09	.32*	-.22	.12	.16
GSRD	-.11	.01	-.28*	.03	-.23	.19	.07
DentCom	-.06	-.51**	.81**	-.17	.27*	-.32**	-.07
DentPa	.03	.47**	-.66**	.13	-.26*	.40**	.06
TranLev	-.07	.16	-.02	.23	.01	.07	-.16

*p<.01

**p<.001

Table 26d. Pearson Correlation Coefficients of All Variables

	PaPain	GSR1	GSR2	GSR3	GSR4	GSR5	GSRD	TranLev
PaPain		.02	.08	.09	.12	.14	.11	-.09
GSR1	.		.87**	.86**	.85**	.84**	.19	-.07
GSR2	.	.		.94**	.92**	.87**	.61**	.06
GSR3	.	.	.		.97**	.92**	.62**	-.03
GSR4	.	.	.	.		.94**	.60**	-.02
GSR5	.	.	.	.	.		.46**	.01
GSRD	.	.	.	.	.	.		-.00
DentCom	.	.08	-.05	-.05	-.10	.08	.25*	-.11
DentPa	.	-.11	-.05	-.06	-.03	-.08	.05	-.11

DACom with DAPain = $-.57^{**}$ DentCom with DentPa = $-.77^{**}$ DentPa with PaPain = $.64^{**}$ DentCom with PaPain = $-.50^{**}$ * $p < .01$ ** $p < .001$

Table 26 revealed that there was a low but significant correlation between age and age at first visit ($p < .01$). This indicated that the greater the age the later the participants reported having visited a dentist for the first time. There was a low but significant negative correlation found between age and level of enjoyment of the hypnotic intervention ($p < .001$) across the individuals who underwent the preparatory hypnotic intervention. Younger people tended to report higher levels of enjoyment of the preparatory procedure. There were generally higher and more significant inverse relationships found between each of the five GSR measures and age ($p < .000$). Lower age was associated with higher conductance, GSR measures.

Age at the first visit to a dentist was found to be related negatively to the dental assistant's ratings of the patients' cooperation. Here again the relationship was low but significant ($p < .01$) and indicated that the dental assistants tended to see as more cooperative those participants whose first dental treatments were at earlier ages. On the other hand, pre-intervention dental anxiety (CDAS) scores did not correlate significantly with age at first visit to a dentist ($p > .1$). Another low but significant correlation was found between the amount of time since their last appointment and their own ratings of fear during the dental treatment ($p < .01$).

Pre-intervention and post-intervention dental anxiety (CDAS) scores were moderately and significantly correlated ($p < .000$) and there were low to moderate correlations found between

the pre-intervention CDAS scores and: dental assistants' ratings of patients' comfort (negatively related; $p < .000$), dental assistants' ratings of patients' pain ($p < .01$), dental fear survey (DFS) avoidance scores ($p < .000$), DFS physiological responsiveness scores ($p < .001$), DFS cognitive scores ($p < .000$), the DFS question rating overall fear experienced due to dental treatment ($p < .000$), dentists' ratings of cooperation ($p < .01$), dentists' ratings of comfort (negatively; $p < .01$), dentists' ratings of pain ($p < .01$), the trait anxiety measure ($p = .002$), and patients' ratings of comfort (negative; $p < .000$), fear ($p < .000$), and pain ($p < .000$). However, correlations of post intervention CDAS scores were moderate to high when considered in relationship to dental assistant's and dentist's ratings of pain, co-operation, and (negative with) comfort (all p 's $< .001$), patients' ratings of fear, pain, and (negative with) comfort (all p 's $< .000$), all DFS scores ($p < .000$), with the GSR4 measure ($p < .01$), and highest rises in GSR conductance measures (GSRD; $p < .000$).

Measures comprising the distress construct were highly interrelated. These measures included post-CDAS scores, dental assistants' ratings of patients' comfort and pain, all DFS measures, dentists' ratings of patients' comfort and pain, patients' ratings of their own comfort, pain, and fear levels, medications (anesthetics) used, and increases in measured skin conductance (GSRD). That the variables were highly interrelated was supported by the fact that of the 91 Pearson correlation coefficients revealing the degree of correspondence of all variables with each other (not including a variable with itself) 75 were significant with alpha levels of .01 or less.

The highest correlations were found among the five GSR measures. Table 7d revealed that these relationships ranged from $r = .84$ to $r = .97$. However, the correlations between the five direct GSR measures and the greatest levels of increase in GSR measures (GSRD) were more moderate, ranging from $r = .46$ to $r = .62$. The correlation coefficient showing the degree of relationship of the the baseline GSR measure (GSR1) with the highest rise of GSR (GSRD) was not significant.

Estimated depth or level of trance was not found to be significantly related to any other measure. For example, neither the patients' ratings of comfort and pain nor other indices of distress were related substantially with patients' rated levels of trance.

Effects of Gender

Post hoc analyses were done to examine the effects of gender. None of the 14 variables measured as aspects of the distress construct were found to be significantly affected by sex. In other words, there were no main sex effects observed on the 14 variables after ANOVA's were computed. However, all DFS measures, including DFSavoidance, DFSphysical, DFSiq, and DFScognitive, showed interaction effects within the groups. The DFS avoidance averages were summarized in Table 27. Most of the interactive effects were the result of women reporting more avoidance of dental appointments and more cancellations than men in the control group.

TABLE 27. Summary of Means and Analysis of Variance of Dental Fear Survey, Avoidance scores by Group and Sex

Group	Men	Women
Indirect Taped	2.70	2.00
Direct Live	2.70	2.30
Indirect Live	2.00	2.50
Control	2.30	4.20
Direct Taped	3.00	2.80
Total	2.54	2.76

Analysis of Variance					
Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Main Effects	5	15.11	3.022	2.265	.055
Group	4	13.90	3.475	2.604	.041
Sex	1	1.21	1.21	.907	.344
2-way interaction					
Group by sex	4	21.54	5.385	4.035	.005
Explained	9	36.65	4.072	3.052	.003
Residual	90	120.10	1.334		
Total	99	156.75	1.58		

Similarly, Table 28 revealed how women in the control group were more likely to have experienced physical expressions of fear than men, but males reported much less physical fear experience after the indirect live preparation than the women. In other words, the indirect live approach was more effective for men than for women.

TABLE 28 Summary of Means and Analysis of Variance of Dental Fear Survey,
Physical scores by Group and Sex

Group	Men	Women
Indirect Taped	10.50	9.20
Direct Live	11.60	9.20
Indirect Live	7.60	11.30
Control	11.80	16.10
Direct Taped	11.60	9.30
Total	10.62	11.02

Analysis of Variance					
Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Main Effects	5	262.560	52.512	4.007	.003
Group	4	258.560	64.640	4.932	.001
Sex	1	4.000	4.000	.305	.582
2-way interaction					
Group by sex	4	220.60	55.150	4.208	.004
Explained	9	483.160	53.684	4.096	.000
Residual	90	1179.600	13.107		
Total	99	1662.760	16.796		

Table 29 summarized the same results for the DFS cognitive measure. Again women reported higher cognitive fear than men in the control and indirect live groups. However, in this case women showed lower cognitive fear in the direct live group.

TABLE 29. Summary of Means and Analysis of Variance of Dental Fear Survey
Cognitive scores by Group and Sex

Group	Men	Women
Indirect Taped	23.90	23.70
Direct Live	33.10	24.90
Indirect Live	19.90	28.90
Control	28.90	43.20
Direct Taped	27.00	26.10
Total	26.56	29.36

Analysis of Variance					
Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Main Effects	5	2165.940	433.188	4.711	.001
Group	4	1969.640	492.485	5.356	.001
Sex	1	196.000	196.000	2.131	.148
2-way interaction					
Group by sex	4	1571.900	392.975	4.274	.003
Explained	9	3737.840	415.316	4.516	.000
Residual	90	8276.000	91.956		
Total	99	12013.840	121.352		

On the DFS fear question, men expressed higher fear in the direct live group than women, and women expressed more overall fear in the indirect live group than men. The results were summarized in Table 30.

TABLE 30. Summary of Means and Analysis of Variance of Dental Fear Survey, Fear question Scores by Group and Sex

Group	Men	Women
Indirect Taped	1.70	1.60
Direct Live	2.50	1.40
Indirect Live	1.40	2.30
Control	2.20	3.00
Direct Taped	1.80	2.10
Total	26.56	29.36

Analysis of Variance					
Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Main Effects	5	10.840	2.168	2.439	.040
Group	4	10.200	2.550	2.869	.027
Sex	1	.640	.640	.720	.398
2-way interaction					
Group by sex	4	13.160	3.290	3.701	.008
Explained	9	24.000	2.667	3.000	.004
Residual	90	80.000	.889		
Total	99	104.000	1.051		

Participants' Perceptions of Forcefulness of Direct versus Indirect Intervention

Participants who were assigned to the four hypnotherapy groups were asked, on a 10-point scale, how *forced* or *pushy* they experienced the intervention to be. A T-test, comparing the means of the combined-direct and combined-indirect groups was computed. Results indicated that the combined-direct groups (mean = 5.90) and the combined-indirect groups (mean = 2.40) differed significantly on the measure; $t(78) = 6.00$, $p = .000$, with the combined direct groups being more *forced* or *pushy*.

Effect of Hypnotherapy Procedure on Whether Participant Would Like The Preparation Again in Future

Participants were asked if they felt they would like to re-experience the preparatory intervention prior to their next dental appointment. Participants of the indirect groups indicated they would like to experience the procedure again significantly more often than did participants of the direct groups. Ninety-five percent of the indirect groups would like to have the intervention again, compared to 72.5 percent for the direct groups. The counts were summarized in Table 31

Table 31. Summary of Frequencies of Yes and No and Chi Square Analysis of Responses to Question of Receiving Preparatory Intervention Again: Direct and Indirect Groups

Response	Directiveness		
	Indirect	Direct	
YES	38(95%)	29(72.5%)	
NO	2(5%)	11(27.5%)	
<u>Chi-Square(1) = 5.878, p = .0153; Minimum E.F. = 6.5</u>			

An identical analysis was performed comparing the effects of *modes of presentation* on whether participants would like the preparatory treatment again. The results indicated no differences on the frequencies of the two groups responses to the question. A summary was provided in Table 32.

Table 32. Summary of Frequencies of Yes and No and Chi Square Analysis of Responses to Question of Receiving Preparatory Intervention Again: Live and Taped Groups

Response	Mode of Presentation		
	LIVE	TAPED	
YES	34(85%)	33(82.5%)	
NO	6(15%)	7(17.5%)	
<u>Chi-Square(1) = 1 p = 1.00; Minimum E.F. = 6.5</u>			

Level of Trance

The estimated level of trance was analyzed for the four groups receiving hypnotherapy interventions. Using Chi-square tests of significance comparing combined direct and combined live groups, there were no significant differences in frequencies of trance levels of each group; Chi-Square = 2.52, $p = .472$. Neither was there an effect detected when the combined live presentation groups and the combined taped presentation groups compared; Chi-Squared = 7.15, $p = .067$.

Participants Ratings of Level of Enjoyment of the Hypnotherapy Treatment

The participants' ratings of their levels of enjoyment of the hypnotherapy were analyzed with a oneway analysis of variance comparing the 4 treatment groups on the measure. The results were summarized in Table 33. Ratings of enjoyment on the 10-point scale were generally high, averaging 8.30 for the entire group. However, there were no significant differences between groups.

TABLE 33. Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Level of Enjoyment by Hypnotherapy Group

Group	N	Mean	SD	Minimum	Maximum
Indirect Taped	20	8.70	1.22	6	10
Direct Live	20	8.20	1.96	5	10
Indirect Live	20	8.45	1.32	5	10
Direct Taped	20	7.85	1.60	5	10
Total	80	9.84	1.55	5	10

Analysis of Variance					
Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	7.90	2.63	1.09	.357
Within Groups	76	182.90	2.41		
Total	79	190.80			

Participant's Comments

Participants were asked if they would comment on their experience and participation in the experiment. The the comments were favorable, generally, for the two live and the taped-indirect groups. They were somewhat less favorable for the direct-taped groups.

(Comments were Summarized in Appendix XV)

Discussion

This section provides a discussion and interpretation of results, with references to related findings. In addition, methodological considerations and possible limitations were addressed. Discussion begins with what have been considered the most critical and primary main-effects results and proceeds to the consideration of secondary findings.

Comparisons of the Five Groups with Multivariate and Univariate Analyses

The finding that participants of the four hypnotherapy treatment groups experienced significantly less distress than the control group participants is consistent with most previous research demonstrating the effectiveness of various forms of hypnotherapy as effective preparations for dental treatment (Egs. Barber, 1976; Goldberg; 1973; Jacoby, 1955; Katcher, Segal, and Beck, 1984; Kleinshmidt, 1971; Marcus, 1963; Moss, 1965; Neiburger, 1973; and Strosberg, 1972). The results also help to allay past criticisms (Schey, 1976) that there has been a lack of proof from group outcome experiments that hypnotherapy can be effective to prevent and reduce the distress of patients undergoing dental treatment. The results prove that dental patients' distress can be effectively reduced by a brief, preparatory, hypnotherapeutic intervention.

All hypnotherapy groups showed some degree of superiority over the control group in reducing dental treatment distress, although the indirect live group was responsible for most of the difference among the five groups. This finding supports the theoretical contentions of

advocates of the indirect, permissive, approach to hypnotherapy (Egs Alman and Carney, 1980; Barber, 1976; and Friction and Roth, 1985). Univariate analyses of variance of the five groups revealed that 7 of the 14 distress measures accounted for the groups' differences. These measures included post-Corah Dental Anxiety Scale scores, the avoidance portion of the Dental Fear Survey, the physical indicators of the Dental Fear Survey, the cognitive portion of the Dental Fear Survey, the general fear question of the Dental Fear Survey, dentist's ratings of their patient's comfort, and increases in skin conductance measured by a GSR monitor throughout the dental treatment. The results suggest that behavioral, physiological, and cognitive aspects of fear and anxiety were mainly affected by the hypnotherapeutic interventions. When the four experimental groups were compared with the control group, pain measures were not significantly affected.

A recent experiment conducted by Price and Barber (1987) appears relevant in light of current results. They analyzed those factors they considered to enhance the efficacy of hypnotic analgesia. It was formerly noted that Joy and Barber (1977) claimed a resounding success with the Rapid Induction Analgesia method with 99 of 100 dental patients. Replications by other experimenters were less impressive. For example, Gillett and Coe (1984) were able to produce a painless dental experience for only slightly more than 52% of their patients. These kinds of discrepancies were the focus of Price and Barber's (1987) report. They analyzed four factors that have possibly influenced the efficacy of hypnotic analgesia with other studies, including:

1. Hypnotic susceptibility after providing direct suggestions
2. Repeated presentations of suggestions rather than once only provided posthypnotic suggestions for anesthesia
3. Affective compared with sensory aspects of pain, and
4. Degree of intensity of the painful stimulation

Regarding hypnotic susceptibility, Price and Barber (1987) noted that previous studies where susceptibility was correlated with analgesia used experimentally produced, supra-

threshold pain levels. In Price and Barber's (1987) experiment, they found that hypnotic susceptibility observed after giving participants direct suggestions was only correlated with analgesia when higher levels of pain were introduced. Furthermore, they found that a group of adult participants who were given continuous suggestions and cues maintained hypnotic analgesia during nociceptive heat stimulation longer and made significantly lower sensory and affective visual analogue (VAS) scale responses than did a group who was given only one instance of suggestions -- particularly lower VAS affective responses to pain. The authors conceded that the RIA method contained many fewer suggestions for analgesia than for fear reduction.

These observations and conclusions from Price and Barber's (1987) report are critical to interpreting results of the current study. First, there was the finding from the current study that, when the five groups were compared, there were no significant differences detected on the three pain intensity measures. However, it must be considered the pain that was reported, either by the control or by the hypnotherapy groups was minimal, a fact that wasn't surprising given that all subjects received anesthetic. The actual pain measure averages reported for participants of each group and in total were as follows:

TABLE 34. Summary of Means and Standard Deviations on Measure of Dental Assistants' Ratings of Participants' Pain Intensity: Rated on 10-point scales

Group	Mean	SD
Indirect Taped	2.350	2.033
Direct Live	2.450	2.438
Indirect Live	1.850	1.226
Control	3.050	2.282
Direct Taped	2.050	2.038
Total	2.350	2.047

TABLE 35. Summary of Means and Standard Deviations on Measure of Dentists' Ratings of Participants' Pain Intensity: Rated on 10-point scales

Group	Mean	SD
Indirect Taped	2.250	.966
Direct Live	3.600	2.088
Indirect Live	3.050	1.959
Control	3.400	2.113
Direct Taped	2.950	1.849
Total	3.050	1.866

TABLE 36. Summary of Means and Standard Deviations on Measure of Patients' Ratings of Their Own Pain Intensity: Rated on 10-point scales

Group	Mean	SD
Indirect Taped	1.850	1.309
Direct Live	2.400	2.011
Indirect Live	1.950	1.099
Control	3.100	2.532
Direct Taped	1.900	2.150
Total	2.240	1.918

It can be seen from tables 34, 35, and 36 that none of the averaged pain ratings of any of the groups or of all participants taken together reached 4 out of possible 10. That there was so little pain reported by any of the groups reduced the possibility that there might be differences in pain ratings among them. Considering the low pain intensities involved, it would have been interesting to compare high and low hypnotic susceptibility participants on the pain measures.

Another factor that could have contributed to the minimal detected analgesic effect of the hypnotic interventions, particularly the indirect-live hypnotherapy, was that the procedure of the current experiment followed Barber's (1977) RIA method, where he reported that the participants in that experiment were given the cue of being touched on the shoulder, as a post-hypnotic suggestion for comfort and relaxation. In their later report, Price and Barber (1987) emphasized the importance of actually reintroducing trance on several occasions to enhance the analgesic effectiveness of the RIA method.

Finally, another critical difference between the earlier report on RIA by Barber (1977), and the later report on the method by Price and Barber (1987) relates to the number of actual suggestions made in reference to analgesia compared with relaxation and anxiety reduction. In their later study they increased the number of suggestions intended to produce analgesia. Moreover, they found that the RIA method would more likely result in lower VAS affective responses to pain rather than VAS sensory reductions. More actual suggestions for analgesia and separate measures of affective and sensory aspects of pain might have produced differences in reported pain levels among groups in the current study.

Methodological Considerations of the Five Group Comparison

It could be argued that a placebo-control group should have been added to control for expectancy effects. One could say that, because the hypnotherapy group participants expected distress reduction effects, then the effects were realized. A placebo-control or attention-control group was not included in this experiment because *attention* is inextricably involved as part of the preparation for hypnosis. Recognizing the crucial nature of client's expectations Erickson and Rossi (1979)

stated:

We agree and emphasize that effective trance work is usually preceded by a preparatory phase during which we help patients create an optimal attitude and belief system for therapeutic responses. A singularly important aspect of this optimal attitude is *expectancy*. Patients' expectations of therapeutic change permits them to suspend the learned limitations and negative life experiences that are the source of their problems. (p. 2-3)

It may be argued that changing a person's expectations about their own responding or other aspects of a typically distressing situation is important to any psychological intervention strategy. For this reason mainly, an additional control group was not employed.

Statistical Concerns With the Five Group Comparison

Mentioned in the results section was the fact that some dependent variables of the MANOVA and ANOVA analysis were not normally distributed and the groups had unequal variances on some measures (a condition referred to as heterogeneity of variance). Barker and

32

Barker (1984) cited a classic study done by Norton (1952) who violated the two assumptions systematically and found that even gross violations of the normality of distribution and homogeneity of variance assumptions had no appreciable effect on the F distribution. Barker and Barker (1984) added that MANOVA and ANOVA are robust with regard to the two noted violations, particularly when the numbers within each cell are equal, as in the current study where group numbers were equal.

Nevertheless, to guard against possible inaccurate conclusions, two steps were taken. First, with MANOVA all test criteria were included, with even the most conservative ones indicating significance. With ANOVAs, data analyses were cross validated using an approach that accounts for unequal variances. The procedure involves weighing averages with estimated variances to produce the "K-statistic" (Krutchhoff, 1987). Measures of each variable of the 14 included in the distress construct were analyzed with the K-statistic, a test much like ANOVA but with the compensation for variance differences. The following two-tailed significance levels were obtained: Post-CDAS, $p = .00$; DAComf, $p = .40$; DAPain, $p = .34$; DFSav, $p = .14$; DFSphys, $p = .02$; DFSiq, $p = .02$; DFScog, $p = .00$; Meds, $p = .36$; DentCom, $p = .02$; DentPa, $p = .03$; PaComf, $p = .15$; PaPain, $p = .34$; PaFear, $p = .49$; GSRD, $p = .00$. The analysis resulted in increasing the DFSav alpha level and decreasing the DentPa ratings to a level of significance of .03 (two-tailed). In all other cases the variables that differed among the five groups were the same as for the ANOVA. Significance levels varied slightly from F to K statistics.

Covariance Analyses

With the exception of time required for appointment (APTime) and dentists' ratings of intensity (DentRI) of the procedure, two measures which were highly correlated, the groups were comparable on all the non-dependent measures, the ones not intended to affect or be affected by the preparatory hypnotherapeutic intervention. Allowing these measures to covary during both multivariate and univariate analyses, the effect was to increase group differences on the distress measures. When both variables were included as covariates, alpha levels were reduced

substantially, to less than .01 for all MANCOVA test criteria. As well, an additional variable, participants' ratings of their own pain (PaPain), gained significance. Considering that some of the hypnotherapy groups were the ones who tended to have higher average times for appointments and intensity ratings, the covariate analyses results were in the expected direction.

Comparisons of Two Combined Groups and The Control Group With Multivariate and Univariate Analyses

Combined Taped and Combined Live presentation groups compared with the control group

The combined taped and live groups showed differences from the control group on the distress measures using MANCOVA, with 7 of 14 univariate differences. Of these, the combined live presentation group was exclusively responsible for differences on three variables and the combined taped groups responsible for differences on one variable. Responsibility for discrepancies with the control group on the other four variables that reached significance was shared between both combined groups.

The relative superiority of live versus taped hypnotherapy presentation modes is contrary to some previous research on the topic(Eg. T. Barber, 1964) yet provides information on an important question about the relative efficacy of taped hypnotherapy. Previously mentioned was Gillett and Coe's (1985) experiment that failed to demonstrate the same level of success using taped presentations of the RIA method. Given the timing and pacing allowed with the live presentation mode they might have had shown more effectiveness with a live RIA approach. Indeed, in the current study there were several occasions when a person obviously needed more time for eye closure or some other response that would not necessarily have been allowed via tape. On the other hand, there were a few instances where a participant expressed their preferences for a taped presentation because, as they stated, "I wouldn't have been able to relax like that in front of another person." In this case the other person was also a stranger.

Combined Direct and Combined Indirect Presentation Groups Compared With the Control Group

The MANCOVA results were also consistent with the experimental hypothesis in this case. Both combined groups were superior to the control group and the combined indirect group was exclusively responsible for 6 of 10 significant variable differences. The 10 variables included the same 7 as the five groups comparison reported earlier, as well as the dental assistants' ratings of participants' pain, the participants' ratings of their own pain, and participants' ratings of their own comfort. The combined direct and indirect groups contrasted significantly with the control group for the significant differences on the other 4 variables.

The finding that the combined indirect group showed superior effects relative to the combined direct group is contrary to recent findings of Lynn, Neufeld, and Matyi (1987). These authors compared the effects of direct and indirect wordings of hypnotic inductions and suggestions on the behavioral and subjective responses of 235 college students. They found that varying the wording of *inductions* had no differential effect on responding, but participants who experienced direct worded *suggestions* responded with more involuntariness and produced more effects compared to participants given indirect worded suggestions. They also reported no interactions between wording of inductions and wording of suggestion types. In this experiment the participants were asked to rate the degree of voluntariness to suggestions and to rate their responsiveness to suggestions.

In my opinion, a possible explanation for the relatively high reported responsiveness to suggestions in the Lynn, Neufeld, and Matyi (1987) study might simply be attributed to memory effects. Given direct suggestions to produce behavioral effects, participants in this condition were cued initially to produce the effect. Participants given indirect suggestions were given the choice how to respond. The direct suggestion participants were then aware that they produced the response and later asked to remember if they indeed produced the response. The indirect suggestion group may not have produced the response, or may have produced another response if a choice was given, would later perhaps forget if they did or did not produce the response and would naturally have trouble recalling if they had responded. For the direct group the suggestions

were identical to the measure of responding, resulting in an already cued memory of at least the expectation.

That the direct subjects reported more involuntariness might have resulted from the hypnotist having made the choice. For example, if one were to direct, "close your eyes" then a person might feel compelled to close them and later report that the event was fairly involuntary. If given the possibility as in "In a short time you might feel like closing your eyes", would one then report later that they did so involuntarily?

The finding of more extensive effectiveness of the indirect approach is contrary to some studies that have failed either to replicate J. Barber's (1977) work or have otherwise been unsuccessful demonstrating the advantages of more indirect and permissive suggestions. (Eg. VanGorp, Meyer, and Dunbar, 1985). It is interesting to note that in the current research there were those who commented about their positive, comfortable responses to the direct, more authoritarian suggestions, either presented live or on tape. However, from the frequencies of those who would like to have the procedure repeated again before their next appointment, there was a clear advantage for the combined indirect group.

Consistent with postulates from the permissive viewpoint, the argument isn't generated from a premise that direct hypnotherapeutic suggestions can't be effective. Rather, those who advocate the use of permissively and attractively worded suggestions make the assumption that those indirect suggestions would be more automatically accepted. Part of the rationale for the assumption is that there would be less chance of conscious opposition when choices are given. Another important assumption, consistent with Ericksonian thought, is that individual's orientations, language, and other aspects of their world view are validated and utilized, whereby suggestions are embedded within an offering of that world view. This doesn't negate the possibility that a person might be receptive to direct, relatively authoritarian suggestions. On the contrary, the approach expects and incorporates those occurrences. Consistent with Yapko's (1983) and Alman and Carney's (1985) suggestions, a hypnotherapist would be best equipped

with skills in the use of both indirect and direct styles. Also, suggestions aren't exclusively direct or indirect but fall on a continuum with polar extremes. From more extreme, indirect perspectives J. Barber's (1976, 1977) RIA method is not considered all that indirect. For example, Lankton and Lankton's (1983) metaphorical suggestion approaches are much less obviously connected to that which they intend to influence.

Enjoyment, Forcefulness, Levels of Trance, and Intervention Preferences

Levels of enjoyment reported by participants of each group were generally high, averaging near 8 out of a possible 10 for all groups. The generally high ratings likely contributed to a lack of difference among the four hypnotherapy conditions. The high enjoyment levels were also reported despite the fact that the groups differed substantially in their reports of the direct interventions' forcefulness, or "pushiness". However, the preference for the indirect style was supported by the significantly higher frequency of yes responses to the question, "would you like the same preparation for treatment again before your next dental appointment?". That they didn't indicate higher enjoyment levels, yet indicated that they would like the treatment again, suggests that the indirect groups considered the interventions to be more effective than did the direct groups.

Estimated levels of trance were not found to discriminate the four treatment groups. Perhaps a more refined measure of trance or an indication of estimated trance level by the participants would have contributed to a more accurate estimation. Having to estimate levels of trance by observable behavior alone was difficult.

Limitations of the Experiment

The conclusions of the experiment were drawn primarily from comparisons made between the experimental groups and a no-treatment control group. As noted previously, because expectancy plays a crucial role in hypnosis the decision was made not to attempt to control for participants' expectations of treatment effectiveness. This may be considered a limitation in that

differences might not have been as significant if experimental groups were compared with an attention or a placebo control group.

Two of the scales used as dependent measures, the CDAS and DFS, have proven reliability and validity through previous independent verifications. A few of the other measures used in the experiment were based on ratings without independent checks on their measurement properties. Consequently, potential for measurement error was sometimes high. This was observed in relation to questions about pain where, on a singular dimension of intensity, participants, dental assistants, and dentists were asked to give a rating on a ten point scale. The distributions of scores of the measures were skewed in the direction of a preponderance of low scores, reducing the chance for detecting group differences on the measures. A degree of reliability and concurrent validity was gained by the fact that many of the distress measures were intercorrelated.

Although attempts were made to utilize participant's idiosyncratic representational channels (visual, auditory, or kinesthetic), in many cases, without time for adequate assessments of these tendencies, they were minimally used. Only when a participant clearly used a predicate in conversation, or alluded to an apparently favored channel were they included as ways of forming suggestions. Therefore, it isn't clear the extent to which this practice had on the effectiveness of the indirect live condition.

With any research, biases of the researcher, intentional or not, can affect outcomes. Although steps were taken to ensure that the dentists and dental assistants were ignorant of each participant's group membership, the experimenter was aware of participants' group affiliations. Possible biases were partially controlled with the use of measures from different sources. Nevertheless there was the possibility for inadvertently influencing outcomes, as the experiment was not blind to the experimenter. Furthermore, the experimenter delivered all of the hypnotherapy treatments.

V SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

Historically, anxiety and pain have been common complaints addressed by psychologists, physicians, and dentists, occupying much of their treatment time. These forms of distress emerge often as inherent aspects of the invasive nature of medical and dental treatment procedures. Otherwise, fear and pain are experienced concomitant with injury and disease processes. New forms of treatment for such distress have been encouraged as the drawbacks and disadvantages of conventional, often intrusive methods, like medications, have been exposed. Partly to address this need, and partly to examine theoretical issues within the area of hypnotherapy, the current study was undertaken.

Early hypnosis procedures emphasized the responses of individuals to a fairly standardized set of instructions called an *induction*. More recently, it has been observed and postulated that inductions that are more personalized and that offer a wider choice of responding will lead to more positive hypnotherapeutic effects. In this experiment an hypothesis was formulated, consistent with the aforementioned postulate, that indirectly worded suggestions, those offering more choice of responding, and live-presentation suggestions, those that are more personalized, would be more effective than direct and tape-recorded presentations in reducing the distress of dental patients during their dental treatment.

A review of the literature revealed that for many dental patients pain is a frequent concern, as fear of pain has been identified as a primary anxiety provoking aspect of the dental visit. The Corah Dental Anxiety Scale (CDAS) and the Dental Fear Survey (DFS) have been most often cited in the literature as measurement instruments of dental anxiety and fear. Although estimates vary, depending on the population sample, approximately 5-15% of the population may be considered dental phobics, whereas some researchers have put the percentage of those who experience at least some degree of dental anxiety at 80%. Men tend to less frequently report anxiety about their dental treatment than women, although the difference might be attributed to the reluctance of men

to admit to their fear. The relationship between both age and socioeconomic status and dental fear is unclear. So far results of studies focussing on these possible correlations have been equivocal.

Pain and fear seem to be inextricably connected, as considerable work has been undertaken to look at how emotional responding affects pain perception. Early traumatic dental history, dentist's attitudes and manners, the patient's psychological history, and long waiting times have all been linked to higher anxiety levels of dental patients.

The main intrusive methods of alleviating dental treatment distress have involved the introduction of drugs. Drugs have been used variously for sedation, anxiety management, local and general anesthesia, non-intrusive methods besides hypnosis have included: enhancing the dentist-patient relationship, exposing children to non-stressful dental visits at an early age, providing exposure to a model, applying behavior modification, providing systematic desensitization treatment, give relaxation training, and provide other forms of cognitive-behavior therapy. Among hypnotherapeutic interventions have included J. Barber's (1977) Rapid Induction Analgesia (RIA) technique. This particular procedure has become a model of an indirectly worded method for preparing patients for dental treatment. Barber (1977) claimed highly impressive success with the RIA method, ostensibly producing analgesia in 99 out of 100 dental patients who were not given anesthetic for their dental treatment. Subsequent replications showed less evidence to support the previous exceptional results. However, these replications were only partial because they provided hypnosis via audio-tape recordings rather than live presentations.

To examine the comparative effects of the two different kinds of wording of inductions and the two different modes of presentation, a group comparison experiment was undertaken. One-hundred dental patients, 50 men and 50 women, were randomly assigned to five groups. One group was a no-treatment control group whose participants were observed as they experienced their dental treatment. Each of the other groups was an experimental group who received treatment in the form of hypnotherapy, within which the inductions and suggestions were either: indirect and taped, direct and live, indirect and live, or direct and taped. The dentists but not the

operator were blind to the group affiliation of each dental patient. Patients distress was measured primarily on 14 dependent variables, including the CDAS, the DFS, dental assistants' ratings of the patient's pain and comfort, dentist's ratings of the patient's pain and comfort, the patient's own ratings of pain, comfort, and fear, the amount of anesthetic medication used, and a physiological measure.

Prior to the experiment, a pilot study was conducted. The pilot took the form of a case study where a 34 year old woman was taken through some rather extensive dental treatment with just hypnotherapy, based on the RIA method, for anesthesia. The pilot was carried out to field test the indirect, live method.

Results of the experiment were positive for hypnosis across all groups. A Multivariate Analysis of Variance (MANOVA) carried out on 14 variables, concurrently, showed significance on four test criteria. A subsequent univariate analysis revealed 7 of 14 of the dependent variables were significant. These significant variables included mainly fear and anxiety measures. Of the four experimental groups the indirect hypnotherapy groups accounted for most of the differences with the control group.

The same analyses were performed with the addition of two variables made to covary, Time for Appointment and Dentist's Ratings of Intensity of the Procedure. This statistical strategy resulted in lowering alpha levels in the case of the MANOVA and adding an additional significant univariate result. The patients' ratings of their own pain gained significance with the analysis of covariance (ANCOVA).

Further analyses were undertaken by combining the four experimental groups. First, the combined taped-presentation groups, the combined live-presentation groups and the control group were combined using the same MANOVA and ANOVA statistical tests that were used for the five groups comparison. Then, in the same way, the combined direct-style group, the combined indirect-style group, and the control group were compared. In the first set of analyses, 8 of the 14 dependent variables were found to differ significantly among the groups. The combined-taped

and combined-live groups were fairly evenly split in accounting for significant differences with the control group. In the second set of analyses 10 of 14 of the variables were found to differ among the combined indirect, direct, and control groups. In this case the indirect group accounted for most of the group differences. The results indicated that the degree of directness had a strong impact of the effectiveness of the hypnotherapy, to the point of contributing to reductions in pain of dental patients undergoing treatment. Whether the induction was delivered live or in-person was somewhat less consequential. The combination of indirect with a live presentation was most effective in reducing distress.

Other analyses showed that many of the distress measures were interrelated. In this sense 75 out of 91 possible significant correlations were produced when each dependent variable was correlated with each other dependent variable.

Dental patients rated the direct induction as more forced or pushy than the indirect versions, and more of those patients who received indirect hypnotherapy indicated that they would like the intervention again in the future. Estimated level of trance was not significantly, differentially affected when the two sets of combined groups were compared. All of the hypnotherapy groups tended to rate their enjoyment of the preparatory procedure highly. A treatment by gender interaction was detected showing that men had more effectiveness with the indirect approach than women, and women were more likely than men to report avoidance and cancellations of dental appointments.

The results were discussed in terms of the general effectiveness of hypnotherapy for reducing dental distress, and the specific, superior effectiveness of the live-presentation, indirect method. The effectiveness of the procedure might have been further enhanced if hypnotic suggestions and cues were provided more frequently, if affective as well as sensory aspects of pain were measured and if the degree of intensity of the painful stimulation were increased. Methodological limitations that were noted included: a no-treatment control rather than an attention-group was utilized, pain intensities during dental treatment were generally low, indirect

live presentations were not as personalized as they could have been, and the experimenter carried out all of the treatment. An identification of the specific conditions that would be most favorable to either a direct or an indirect approach would be a worthwhile direction for future research. Applying the method to other settings and circumstances of distress in the form of fear and pain, and developing indirect hypnotic procedures for children were also suggested as useful areas for further study

Conclusions

Dental patients experience an alleviation of distress and enjoy hypnotherapy presented before their dental treatment regardless of their degree of hypnotic susceptibility. Hypnotherapy with suggestions for developing comfort and relaxation helps to prevent much of the anxiety distress often associated with dental treatment. Dental patients tend to show more positive distress reducing reactions to indirectly worded suggestions, especially when those suggestions are combined with live presentations. Indirectly worded suggestions can also be effective in alleviating the pain aspects of the distress experiences of patients during dental treatment. The results are supportive of J. Barber's (1977) earlier work.

The term *distress* is a useful construct for encompassing the combination of discomfort, fear, anxiety and pain endured by patients during dental treatment. Direct inductions are seen by patients as being more forced or pushy than indirect inductions. Direct, less permissively worded hypnotherapy styles can be effective for reducing anxiety aspects of distress, whereas more extensive alleviation or prevention of anxiety and pain are shown with more permissively worded, indirect styles. Men might be more responsive to indirect suggestions and women might tend to be more responsive to direct suggestions, according to a gender by treatment interaction. Patient's estimated level of trance was found not to be differentially affected by hypnotherapy treatments, nor was the measure found to correlate with any of the distress measures.

Following are suggested implications of these conclusions for dentistry, hypnosis, and implications for applying the approach in other settings where distress is typically experienced.

Implications

Implications For Dentistry

Applications of the current research pertain to assessment and intervention for reducing mild to moderate distress of dental patients. Both the Corah Dental Anxiety Scale (CDAS) and the Dental Fear Survey (DFS) were found to be reliable for identifying those with high degrees of anxiety and those with specific fears of particular aspects of the dental treatment experience. All interventions showed effectiveness in reducing behavioral, physical, and cognitive components of anxiety and fear. Although the indirect and live conditions proved superior, the indirect taped group showed impressive effects that approached those of the live mode.

Researchers have already generally identified the level at which the CDAS discriminates those who are phobic of dental treatment. For example, Corah, Gale, and Illig (1978) found that dental phobics averaged 17.8 on the CDAS. In the current experiment 16 was designated as the upper cutoff score. Those who scored above that weren't included in the experiment but were given indirect live inductions, and in two cases for more than one appointment. Also, through the course of the experiment I happened to have been referred a 16 year old boy, too young and too phobic to be involved in the experiment, but with whom I worked for five sessions using a combination of hypnosis and coping skills training, with some success. The point is that there are those dental patients who require more in-depth, longer duration treatment beyond a single, 20 minute preparatory session. The CDAS was very useful for identifying those highly anxious and phobic patients.

While the CDAS was accurate for identifying and predicting those who would react with high levels of anxiety during dental treatment, the DFS was useful for identifying, more specifically, aspects of the dental treatment that a patient responded to fearfully. Patients tended to react with most trepidation to, first, the anesthetic injection, second the drilling and, occasionally, worries

about gagging, or suffocating from the rubber dam placement. From an analysis of patients' responses to individual questions of the DFS, it was obvious that of the six possible fear-related physiological reactions during dental treatment, muscle tension was most frequently reported. Forty-five percent of all patients, regardless of group, reported high scores (between 3 and 5 inclusively) on the muscle tension item of the DFS. The second highest percentage was 30, reported for the response salivation, where 30% of the dental patients reported high levels of salivation. Since nausea was reported by only one patient, its inclusion as an item of the DFS is questionable.

The highest cognitive-related fear expectancies were reported by participants in relation to seeing and feeling the needle, 30% and 45% scoring the item high, respectively. Hearing and feeling the drill were items scored high by 33% and 37% of the participants. The item, "When pain persists even after the anesthetic", was also scored highly by a relatively high percentage of the participants (36%). These cognitive items of the DFS appear closely related to potential pain experiences within the dental treatment, suggesting that fear actually is closely tied to pain.

Using the CDAS in combination with the DFS a dentist could quickly predict the intensity of anxious responding and the dental treatment activities that would be most fear provoking for that patient. In addition, the dentist would have the opportunity to know if the patient's locus of fear responsiveness was mainly behavioral, as with high DFS avoidance scores, physical with high DFS physical scores, cognitive with high DFS cognitive scores, or affecting some combination thereof. The information could be gathered on the two scales in 10 minutes or less, possibly in addition to medical information requested of the patient during their first visit.

With the information from the two scales a dentist could identify three groups of patients based on anxiety measures. The first group would be the non- to mildly anxious individuals who don't require preparation. The next group might be those who are moderately to highly anxious, and perhaps particularly sensitive to a specific set of fear provoking stimuli, for example, related to the syringe. With skill training in the area of hypnosis the dentist might give these patients indirect

induction/suggestion tapes prior to their dental treatment and use posthypnotic cues (touching their shoulder, and/or verbal suggestions) more often around the times the patients are likely to be most fearful. The hypnosis would likely be even more effective if the suggestions were aimed at particular problem areas and specific suggestions could be made. For example, with problems directly related to injections, more specific suggestions for comfort, relaxation, and analgesia during injections could be made. The final group would be those who are highly anxious and phobic of dental treatment and whom the dentist could consider sending for more specialized anxiety reduction treatment.

Implications for Hypnosis Practice and Theory

A major review article by Kihlstrom (1985) described what he considered to be the predominant psychological theories of hypnosis. He described the Edmonston (1981) position that hypnosis is the same process as relaxation, criticized the altered state explanation of hypnosis put forward by Hilgaard (1978) considered the neodissociation conceptions as described, for example, by Nemiah (1984), and failed to mention anywhere, the extensive, practical work of M. Erickson. Kihlstrom's (1985) theoretical position with hypnosis, a common position in the theoretical literature, is clearly stated by, "Response to suggestions is central to hypnosis, and most theoretical controversy surrounds them.

Like many authors, Kihlstrom's (1985) focus was mainly on person's responses to standardized, directly worded suggestions that were measured on hypnotic susceptibility scales. He held the assumption that the hypnosis induction was a relatively stable, standard set of instructions for everyone. Although he mentioned the future possibility of integrating the disparate theoretical positions, of construing hypnosis as relaxation, an altered state of consciousness, dissociation, and social behavior, Kihlstrom (1985) argued that a rapprochement of these theories was premature and that a primary, singular theory must be decided upon.

Working from an Ericksonian viewpoint, Gilligan (1987) has emphasized the interaction between hypnotherapist and participant, and that there have been three main approaches to

viewing the relationship, that the interaction can be seen as authoritarian, standardized, or cooperative. The authoritarian approach holds the power of the hypnotist to be critical, the standardized approach emphasizes the participant's susceptibility, and the cooperative approach stresses the hypnotist and participant interactions. Gilligan (1987) cited research that identified difficulties with the standardized approach. First, Gilligan (1985) noted that those who advocated the standardized approach have assumed that a standardized induction is "a valid way of assessing hypnotic ability" (p. 7) but neglects to take into account that people experience hypnosis in different ways and rules out the possibility that people have different preferences in styles. Secondly, Gilligan (1987) observed that the approach was based solely on only observable behavioral responses, leaving out critical, experiential aspects hypnosis and, consequently, aspects of participants experiential responses. A third point made by Gilligan (1987) was that the standardized approach fails to account for repeated findings that susceptibility scores of individuals may be significantly modified. Gilligan (1987) added that assumptions of the standardized approaches lead to relative inflexibility in interactions with participants.

The current research results supported the suggestion to remain flexible, that the flexibility offered by a less directive approach, especially when delivered live, offered a wider range of choices of experience, and that individuals will less likely resist suggestions when the suggestions are given as choices, and when the suggestions are consistent with the person's ongoing experience. The experiment also showed that direct forms of hypnotherapy can produce beneficial distress reducing effects for dental patients.

Implications for The Use of Hypnosis in Other Distress Settings

The importance of being flexible with hypnosis in other settings where people experience distress in the form of anxiety and pain is underlined by findings of this clinical experiment. Direct, tape-recorded hypnotherapy may be effective with some people, but more extensive distress alleviation will be achieved if hypnotherapy is indirectly worded and presented live. Especially when pain is the most critical part of the complex of distress experienced by a particular patient

group, it becomes more important that analgesia suggestions are presented indirectly, frequently, and with the possibility of reintroducing post-hypnotic cues.

The latter can only be achieved with live presentations, affording close interactions between the hypnotherapist and patient.

Suggestions for Future Research

Although the results of this study have corroborated Barber's (1976, 1977) results, more research needs to be undertaken to identify the conditions that would be most favorable for the success of a given style of hypnotherapy. What factors contribute most to the success of either indirect and direct methods? What characteristics of the participants would determine a style preference? Yapko (1983), for example, has suggested that hypnotherapists would be best prepared by having skills with both direct and indirect methods. More experimentation needs to be done to assess with whom each would be most appropriate.

A clinical experiment where the effectiveness of the indirect method was enhanced by, as suggested recently by Price and Barber (1987), (a) increasing the number of suggestions related to analgesia, (b) more frequently reintroducing trance and using more posthypnotic cues, as well as involving higher pain intensity procedures, would go further than the current experiment to test the analgesic effectiveness of the indirect hypnotherapy method. Furthermore, the use of both sensory and affective measures of pain would be preferable to a singular, intensity measure.

The applications of this approach to other clinical settings where distress is experienced as part of the disease process or as a result of the invasive nature of medical treatments should be undertaken. Indirect, live hypnotherapy procedures should be evaluated in such settings as hospital burn-patient wards, cancer patient wards and hospitals, and cardiology wards, where anxiety and pain distress are commonplace. Further testing of hypnotherapy procedures should include the effectiveness of approaches after more extensive exposure to the treatment method and some practice. The current experiment examined effectiveness after only one brief exposure.

It would be interesting to develop a similar hypnotherapy approach to apply to children's fears of dental and, perhaps, medical invasive procedures. Adults have been the usual participants in research on this topic.

BIBLIOGRAPHY

- Agras, W. S., Sylvester, D., & Oliveau, D. C. (1969). The epidemiology of common fears and phobias. Comprehensive Psychiatry, 10, 151-156.
- Akins, T, Hollandsworth, J. G. Jr., & O'Connell, T. (1982). Visual and verbal modes of information processing and their relation to the effectiveness of cognitively based anxiety-reduction techniques. Behavior Research and Therapy, 20(3), 261-268.
- Allen, G. D. (1984). Dental anesthesia and analgesia: Local and general (3rd ed). Baltimore, RI: Williams and Wilkins.
- Alman, B. (1979). Consequences of direct and indirect suggestion on success of post hypnotic behavior. Doctoral Dissertation. California School of Professional Psychology.
- Alman, B. M., and Carney, R. E. (1980). Consequences of direct and indirect suggestions on success of posthypnotic behavior. The American Journal of Clinical Hypnosis, 23(2), 112-118.
- Ament, P. (1955). A psychosomatic approach to the use of anesthesia for a hysterical patient: A case history. Journal of Clinical and Experimental Hypnosis, 3, 120-123.
- Anderson, K. O., & Masur, F. T. (1983). Psychological preparation for invasive medical and dental procedures. Journal of Behavioral Medicine, 6(1), 1-40.
- Angelos, J. (1978). A comparison of the effects of direct and indirect methods of hypnotic induction in the perception of pain. Doctoral Dissertation. California School of Professional Psychology.
- Auerbach, S. M. (1983). State-trait anxiety and adjustment to surgery. Journal of Consulting and Clinical Psychology, 40, 264-271.
- Auerbach, S. M., Kendall, P. C., Cutler, H. f., & Levitt, N. R. (1976). Anxiety, locus of control, type of preparatory information and adjustment to oral surgery. Journal of Consulting and Clinical Psychology, 44, 809-818.

- Ayer, W. A. (1983). In Overcoming dental fear: strategies for its prevention and management. Journal of the American Dental Association, 107, 8-27.
- Baker, J. D., May, H. J., Revicki, D. A., Kessler, E. R., & Crawford, E. G. (1984). Use of orally administered diazepam in the reduction of dental anxiety.
- Bandler, R. & Grinder, J. (1979). Frogs into princes. Moale, Utah: Real People Press.
- Bandura, A. (1969). Principles of behavior modification. New York: Holt, Rinehart and Winston.
- Barber, J. (1976). Effectiveness of hypnotic analgesia in the reduction of experimental dental pain in individuals of both high and low hypnotic susceptibility. Unpublished Doctoral Dissertation: University of Southern California.
- Barber, J. (1977). Rapid induction analgesia: A clinical report. American Journal of Clinical Hypnosis, 23, 4-9.
- Barber, J. (1980). Hypnosis and the unhyponotizable. American Journal of Clinical Hypnosis, 23, 4-9.
- Barber, T. X. & Calverley, D. S., (1964). Comparative effects on "hypnotic-like" suggestibility of recorded and spoken suggestions. Journal of Consulting Psychology, 28, 384.
- Barker, H. R. (1984). Multivariate analysis of variance (MANOVA): A practical guide to its use in scientific decision making. University, Alabama: The University of Alabama Press.
- Bartlett, K. A. Jr. (1970a). Knowledge derived from hypnosis. Journal of the American Dental Association, 80(1), 125-132.
- Bartlett, K. A. Jr. (1970b). Hypnotic treatment of a novacain allergy. American Journal of Clinical Hypnosis, 12(4), 222-226.
- Berggren, U., & Carlsson, S. G. (1984). Psychometric measures of dental fear. Community Dentistry and Oral Epidemiology, 12(5), 319-324.

- Berggren, U., & Carlsson, S. G. (1985). Usefulness of two psychometric scales in Swedish patients with severe dental fear. Community Dentistry and Oral Epidemiology, 13, 70-74.
- Berggren, U., & Linde, A. (1984). Dental fear and avoidance: A comparison of two modes of treatment. Journal of Dental Research, 63(10), 1223-1227.
- Berggren, U., & Meynert, G. (1984). Dental fear and avoidance: causes, symptoms and consequences. The Journal of the American Dental Association, 109 (Aug), 247-251.
- Bernstein, D. A., & Kleinknecht, R. A. (1982). Multiple approaches to the treatment of dental fear. Journal of Behavior Therapy and Experimental Psychiatry, 13(4), 247-292.
- Bernstein, D. A., Kleinknecht, R. A., & Alexander, L. D. (1979). Antecedents of dental fear. Journal of Public Health Dentistry, 34, 113-124.
- Best, E. S. (1930). Elimination of pain in dentistry. The Journal of the American Dental Association, 17, 1481.
- Borland, L. R., & Epstein, S. (1961). Psychological Evaluation of hypnosis in dentistry. The Journal of the American Dental Association, 62(1), 54-65.
- Bowers, L. T. (1982). The legality of using hand-over-mouth exercise for management of child behavior. Journal of Dentistry for Children, 49(4), 257-265.
- Bradley, B. E. (1981). The historic use of diazepam in dentistry. Anesthetic Progress, 28 (2), 38-41.
- Buonomano, L., & Buonomano, V. D. (1979). Biofeedback: The emergence of a new dental and medical perspective. General Dentistry, 27(2), 65-69.
- Burgess, T. O. (1952). Hypnosis in dentistry, in Lecron (Ed.), Experimental hypnosis. New York: MacMillan.
- Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. Chicago: Rand-McNally.
- Camner, L., Anderson, E., Eurinius, M. (1983). Treatment of a dental patient with a dental phobia. Quintessence International, 14(7), 759-760.

- Cannistraci, A. J. (1976). A method to control bruxism: Biofeedback-assisted relaxation therapy. Journal of the American Society for Preventive Dentistry, 6, 12-15.
- Chastain, F. R. (1965). A case of excessive gagging. American Journal of Clinical Hypnosis, 7, 257-258.
- Chiappone, S. J. (1956). Hypnoanesthesia, surgery and full denture construction with hypnodontics. Journal of the American Society of Psychosomatic Medicine and Dentistry, 3(2), 16-17.
- Clarke, J. C., & Jackson, J. A. (1983). Hypnosis and behavior therapy: The treatment of anxiety and phobias. New York: Springer.
- Coffee, P. A. F., & DiGiusto, J. (1983) The effects of waiting time and waiting room anxiety on dental patients' anxiety. Australian Dental Journal, 28(3), 130-142.
- Cohen, L. A., Snyder, T. L., and Labelle, A. D. (1982). Correlates of dental anxiety in a university population. Journal of Public Health Dentistry, 42, 228-235.
- Cohen, S. B. (1977). On experiencing pain. American Journal of Clinical Hypnosis, 19(3), 135-137.
- Cook, S. S. (1977). The use of deep relaxation to reduce fear in dental patients. Florida Dental Journal, 48(1), 15-16.
- Coplans, M. P., & Green, R. A. (1983). (Eds.) Anesthesia and sedation in dentistry, in Monographs in anesthesiology (V. 12), A. R. Hunter & T. E. J. Healy (Eds.-in-chief). Amsterdam: Elsevier.
- Corah, N. L. (1969). Development of a dental anxiety scale. Journal of Dental Research, 48, 596.
- Corah, N. L. (1984). Reduction of patient stress and the patient-dentist relationship. New York State Dental Journal, 50(8), 478-479.
- Corah, N. L., Gale, E. N., & Illig, S. J. (1978). Assessment of a dental anxiety scale. Journal of the American Dental Association, 97, 816-819.

- Corah, N. L., Gale, E. N., & Illig, S. J. (1979a). Psychological stress reduction during dental procedures. Journal of Dental Research, 58(4), 1347-1351.
- Corah, N. L., Gale, E. N., & Illig, S. J. (1979b). The use of relaxation and distraction to reduce psychological stress during dental procedures. Journal of the American Dental Association, 98, 390-394.
- Corah, N. L., O'Shea, R. M., & Bissell, G. D. (1985). The dentist-patient relationship: Perception by patients of dental behavior in relation to satisfaction and anxiety. Journal of the American Dental Association, 111 (Sep), 986-990.
- Cosgrove, D. (1976). Sedation in dentistry. Australian Dental Journal, 21, 128-130.
- Craig, J. R., & Metze, L. P. (1986). Methods of Psychological Research (2nd ed)., Monteredgy, CA: Brooks/Cole Publishing.
- Crasilneck, H. B., & Hall, J. A. (1985). Clinical Hypnosis: Principles and Applications (2nd ed). Orlando, FL: Grune and Stratton.
- Crockett, B. (1963). Dental survey: Southeastern state college. Journal of the Oklahoma Dental Association, 51, 25.
- Crowley, R. (1980). Effects of indirect hypnosis (rapid induction analgesia) for relief of acute pain associated with minor podiatric surgery. Dissertation Abstracts International, 40, 4549.
- Davideau, A. (1966). Controlled amnesia in dentistry. Stomatologia, 67, 589.
- DiBona, M. C. (1979). Nitrous oxide and hypnosis: A combined technique. Anesthesia Progress, 26(1), 17-19.
- Donaldson, D. (1982). Anxiety: its management during the treatment of the adolescent dental patient. International Dental Journal, 32(1), 44-45.
- Drash, P. W. (1974). Behavior modification: new tools for use in pediatric dentistry with the handicapped child. Dental Clinics of North America, 18(3), 617-631.
- Dufour, J. (1968). Tooth extraction under hypnosis in a hemophiliac. Rev. Fr. Odo. Tostomat, 15, 955-960.

- Eigenbrode, C. R. & Affalter, R. (1976). Successful treatment of a patient with severe dental phobia. General Dentistry, 24(6), 37-38.
- Erickson, M. (1964). The confusion technique in hypnosis. American Journal of Clinical Hypnosis, 6, 183-207.
- Erickson, M. H. & Rossi, E. L. (1979). Hypnotherapy: An exploratory casebook. New York: Irvington.
- Evans, R. I. (1978). Motivating changes in oral hygiene behavior: some social psychological perspectives. Journal of Preventative Dentistry, 5(4), 14-18.
- Eversaul, G. A. (1976). In, An interview with George A. Eversaul, by E. S. Nacht. Journal of the American Society of Preventative Dentistry, 6(6), 12-15.
- Fields, H., & Pinkham, J. (1976). Videotape modelling of the child dental patient. Journal of Dental Research, 55(6), 958-963.
- Fiset, L., Milgram, P., Weinstein, P., Getz, T., & Glassman, P. (1985). Psychophysiological responses to dental injections. Journal of the American Dental Association, 111 (Oct), 578-583.
- Foreman, P. A. (1979). Behavioral considerations in patient management. Anesthesia Progress, 26(6), 161-165.
- Foreman, P. A. (1984). An integrated approach to the management of dental anxiety. Australian Dental Journal, 27(1), 10-14.
- Freidson, E. & Feldman, J. J. (1958). The public looks at dental care. Journal of the American Dental Association, 57, 325-335.
- Fricton, J. R., & Roth, P. (1985). The effects of direct and indirect hypnotic suggestions for analgesia in high and low susceptibility subjects. American Journal of Clinical Hypnosis, 27(4), 226-231.
- Gale, E. N. (1972). Fears of the dental situation. Journal of Dental Research, 51, 964-966.
- Gale, E. N., & Ayer, N. M. (1969). The treatment of dental phobias. Journal of the American Dental Association, 73, 1304-1307.

- Gale, E. N., Carlsson, S. G., Eriksson, A., & Jontell, M. (1984). Effects of dentists' behavior on patients' attitudes. Journal of the American Dental Association, 109, 444-446.
- Gatchel, R. J. (1980). Effectiveness of two procedures for reducing dental fear: group administered desensitization and group education and discussion. Journal of the American Dental Association, 101(4), 634-637.
- Gatchel, R. J. (1986). Impact of a videotaped dental fear reduction program on people who avoid dental treatment. Journal of the American Dental Association, 112(2), 218-221.
- Gatchel, R. J., Ingersoll, B. D., Bowman, L., Robertson, M. C., Walker, C. (1983). The prevalence of dental fear and avoidance: A recent survey study. Journal of the American Dental Association, 107, 609-610.
- Geer, J. H. (1965). The development of a scale to measure fear. Behavior Research and Therapy, 45-53.
- Gillett, P. L., & Coe, W. C. (1984). The effects of rapid induction analgesia (RIA), hypnotic susceptibility, and the severity of discomfort on reducing dental pain. American Journal of Clinical Hypnosis, 27(2).
- Gilligan, S. G., (1987). Therapeutic trances: The co-operation principle in Ericksonian hypnotherapy. New York: Brunner/Mazel.
- Giovannitti, J. A. (1984). Nitrous oxide and oral premedication. Anesthesia Progress, 31(2), 869.
- Golan, H. P. (1971). Control of fear reaction in dental patients by hypnosis: Three case reports. American Journal of Clinical Hypnosis, 13(4), 279-284.
- Goldberg, G. (1973). The psychological, physiological, and hypnotic approach to bruxism in the treatment of periodontal disease. Journal of the American Society of Psychosomatic Dentistry and Medicine, 20(3), 75-91.
- Gordon, D. A., Terdall, L., and Sterling, E. (1974). The use of modeling and desensitization in the treatment of a phobic child patient. Journal of Dentistry for Children, 41(2), 102-105.

- Gutwirth, S. W. (1965). Hypnosis and suggestion vs. physiological tension control. Cal. 28(12, 8-9.
- Haley, J. (1973). Uncommon therapy. New York: Norton.
- Hallstrom, T., & Halling, A. (1984). Prevalence of dentistry phobia and its relation to missing teeth, alviolar bone loss, and dental care habits in an urban community sample. Acta Psychiatrica Scandinavia, 70, 438-446.
- Hilgard, E. R., & Hilgard, J. R. (1983). Hypnosis in the relief of pain (revised ed). Los Altos, CA: William Kaufman.
- Hoskovec, J., Svorad, D., & Lanc, O. (1963). The comparative effectiveness of spoken and tape-recorded suggestions of body sway. International Journal of Clinical and Experimental Hypnosis, 11, 163-164.
- Jacobs, B. L., & Nicastro, J. D. (1978). Anxiety -- stress or fear as related to dentistry in children and adults. Dental Hygiene, 52(8), 387-391.
- Jacoby, J. D. (1955). A statistical report on the practical use of hypnosis in dentistry. Journal of Clinical and Experimental Hypnosis, 3, 117-120.
- Jacoby, J. D. (1960). Statistical report on general practice hypnodontics. International Journal of Clinical and Experimental Hypnosis, 8, 115-119.
- Janis, I. (1958). Psychological stress: Psychoanalytic and behavioral studies of surgical patients. New York: Wiley & Sons.
- Janis, I. (1971). Stress and frustration. New York: Harcourt Braa & Jovanovich.
- Janis, I., & Mann, L. (1977). Decision making: A psychological analysis of conflict, choice, and commitment. New York: MacMillan.
- Johnson, S., Chapman, K., & Huebner, G. (1984). Stress reduction prior to oral surgery. Anesthesia Progress, 31(4), 165-167.
- Johnson, R., & Machen, J. B. (1973). Behavior modification techniques and maternal anxiety. Journal of Dentistry for Children, 40(4), 272-276.

- Joy, E. D. (1983). In Emphasis, Overcoming dental fear: Strategies for its prevention and management, Journal of the American Dental Association, 107, 18-27.
- Joy, E. D., & Barber, J. (1977). Psychological, physiological, and pharmacological management of pain. Dental Clinics of North America, 21(3), 577-593.
- Kaplan, A. S., & Rubin, J. G. (1984) The dental phobia clinic. The New York State Dental Journal, 50(8), 491-495.
- Katcher, A., Segal, H., & Beck, A. (1984). Comparison of contemplation and hypnosis for the reduction of anxiety and discomfort during dental surgery. American Journal of Clinical Hypnosis, 27 (1), 14-20.
- Kaufman, E., Dworkin, S. F., LeResche, L., Chen, A. C. N., Shubert, M. M., & Benedetti, C. (1984).
 Analgesic action of intravenous diazepam. Anesthesia Progress, 28 (2), 38-41.
- Kehoe, M. J. (1967). Hypnotic suggestion as a method of treatment. American Journal of Psychiatry, 123, 1577-1581.
- Kendall, P. C., Williams, L., Pechacek, T. F., Graham, L. E., Sisslak, C., & Herzoff, N. (1979).
 Cognitive-behavioral and patient education interventions in cardiac catheterization procedures: The Palo Alto medical psychology project. Journal of Consulting and Clinical Psychology, 47, 49-58.
- Keys, J., Field, M., & Korboot, P. (1978). Detecting and treating phobic children: Part II, treatment. Journal of Dentistry for Children, 45(4) 301-305.
- Kihlstrom, J. F. (1985). Hypnosis. Annual Review of Psychology, 36, 385-418.
- Kieiman, M. B. (1982). Fear of dentists as an inhibiting factor in children's use of dental services. Journal of Dentistry for Children, 49(3), 209-213.
- Kleinknecht, R. A., & Bernstein, D. A. (1978). The assessment of dental fear. Behavior Therapy, 9, 626-634.
- Kleinknecht, R. A., Klepac, R. K., & Alexander, L. D. (1973). Origins and characteristics of fear of dentistry. Journal of the American Dental Association, 86, 842-848.

- Kleinknecht, R. A., Thorndike, R. M., McGlynn, F., & Harkavy, T. (1984). Factor analysis of the dental fear survey with cross validation. Journal of the American Dental Association, 108, 93.
- Kleinschmidt, J. L. (1971). Hypnosis in the practice of dentistry. Journal of the Missouri Dental Association, 51(2), 9-14.
- Klepac, R. K., Dowling, J., & Hauge, G. (1982). Characteristics of clients seeking therapy for the reduction of dental avoidance reactions to pain. Journal of Behavior Therapy and Experimental Psychiatry, 13, 293-300.
- Klorman, R., Hilpert, P., Michael, R., Labana, C., & Sveen, C. (1980). Effects of coping and mastery modelling on experienced and inexperienced pedodontic patients' disruptiveness. Behavior Therapy, 11, 156-165.
- Kohlberg, R., Greenberg, D., Reymore, L., & Hass, G. (1972). Behavior modification and the management of mentally retarded dental patients. Journal of Dentistry for Children, 39, 61-66.
- Krutchkoff, R. G. (1987). One-way analysis of variance when the error variances may be unequal. Unpublished document: Blacksburg, Virginia: Virginia Polytechnic Institute and State University.
- Lamb, D. H., & Strand, K. H. (1980). The effect of a brief relaxation treatment for dental anxiety on measures of state and trait anxiety. Journal of Clinical Psychology, 36 (1), 270-274.
- Langer, E. J., Janis, I. E., and Wolfer, J. A. (1975). Reduction of psychological stress in surgical patients. Journal of Experimental and Social Psychology, 11, 155-165.
- Langley, M. A. (1885). The physiological action of mesmerism. The Dental Record, 5, 365-372 and 484-499.
- Lankton, S. R., & Lankton, C. H. (1983). The answer within: A clinical framework for Ericksonian hypnotherapy. New York: Brunner/Mazel.
- Lautch, H. (1971). Dental phobia. British Journal of Psychiatry, 119, 151-158.

- Light, J., & Alterbaum, C. (1975). A behavior modification approach in the habilitation of a cleft palate patient. New York Journal of Dentistry, 45 (4), 114-118.
- Litchfield, N. B. (1979). Hypnotic desensitization of the dental phobic patient: A case report. Dental Anesthesia and Sedation, 8(2), 294.
- Lucas, O. N. (1965). Dental extractions in the hemophiliac: Control of the emotional factors by hypnosis. American Journal of Clinical Hypnosis, 7, 301-306.
- Lynn, S. J., Neufeld, V., & Matyi, C. L. (1987). Inductions versus suggestions: Effects of direct and indirect wording on hypnotic responding and experience. Journal of Abnormal Psychology, 96(1), 76-79.
- Machen, J. B., & Johnson, R. (1974). Desensitization, model learning, and the dental behavior of children. Journal of Dental Research, 53, 83-87.
- Malamed, S. F. (1985). Sedation: A guide to patient management. St. Louis: C. V. Mosby.
- Marcus, H. W. (1963) Hypnosis in dentistry, in J. M. Schneck (Ed) Hypnosis in modern medicine, (3rd ed)(pp. 229-279). Springfield, IL: Charles C. Thomas.
- Marcuse, F. L., & Phipps, G. T. (1956). A demonstration of dental extraction with hypnotic anesthesia. Journal of Clinical and Experimental Hypnosis, 4, 2-4.
- Margolis, B. S. (1966). A technique for rapidly inducing hypnosis. Cal, 28 (12), 21-24.
- Marks, H. S. (1978). The genesis of fear and anxiety in young dental patients. Journal of Dentistry for Children, 45 (5), 306-309.
- Mason, R. F. (1973). Treatment of fear induced conditioned response -- A case report. Australian Dental Journal, 18, 309-310.
- McAmmond, D. M., Davidson, P. O., and Kovitz, D. M. (1971). A comparison of the effects of hypnosis and relaxation training on stress reactions in the dental situation. American Journal of Clinical Hypnosis, 13, 233-242.
- Meichenbaum, D. (1977). Cognitive-behavior modification. New York: Plenum.

- Melamed, B. G. (1979). Behavior approaches to fear in dental settings. In M. Hersen, R. Eisler, and P. Miller (Eds.), Progress in behavior modification, (pp. 171-203). New York: Academic Press.
- Melamed, B. G., & Siegel, L. S. (1980). Management of dental patients. Behavioral medicine: Practical applications in health care (pp. 356-379). New York: Springer.
- Melamed, B. G., Weinstein, D., Katlin-Borland, M., Hawes, R. (1975). Reduction of fear-related dental management problems with use of filmed modeling. Journal of the American Dental Association, 90 (5), 1022-1026.
- Melamed, B. G., Yurcheson, R., Fleece, L., Hutcherson, S., & Hawes, R. (1978). Effects of filmed modeling on the reduction of anxiety-related behaviors in individuals varying in level of previous experience in the stress situation. Journal of Consulting and Clinical Psychology, 46, 1357-1367.
- Melzack, R. & Wall, P. D. (1965). Pain mechanisms: A new Theory. Science, 150, 971.
- Milam, S. B. (1984). General anesthetics: A comparative review of pharmacodynamics. Anesthesia Progress, 31 (3), 116-123.
- Morely, K. R., Netlety, C. T., & Titley, K. C. (1979). Behavior modification techniques for phobias. Ontario Dentist, 56(5), 11-16.
- Morosko, T. E., & Simmons, F. F. (1966). The effect of audio analgesia on pain threshold and pain tolerance. Journal of Dental Research, 45 (6), 1608-1617.
- Morse, B. S. (1977). An exploratory study of the use of meditation alone and in conjunction with hypnosis in clinical dentistry. Journal of the Society for Psychosomatic Dentistry and Medicine, 24 (4), 113-120.
- Moss, A. A. (1952). Hypnodontics or Hypnosis in Dentistry. Brooklyn, NY: Dental Items of Interest.
- Moss, A. A. (1956). Hypnodontics, in L. M. LeCron (Ed) Experimental hypnosis (pp. 303-319). New York: MacMillan.

- Moss, A. A. (1963). Hypnosis for pain management in dentistry. Journal of Dental Medicine, 18, 110-112.
- Moss, A. A. (1965). Hypnodontics: Hypnosis in dentistry. The British Journal of Medical Hypnotism, 17, (2).
- Neiburger, E. J. (1973). Sensory confusion through hypnosis: A technique of rapid patient control during dental treatment. Journal of the American Society of Psychosomatic Dentistry and Medicine, 20(2), 54-57.
- Neiburger, E. J. (1976). Waking hypnosis through sensory confusion: 302 cases of dental prophylaxis. Journal of the American Society of Psychosomatic Dentistry and Medicine, 23(3), 88-98.
- Neiburger, E. J. (1978). Child response to suggestion: Study of age, sex, time, and income levels during dental care. Journal of Dentistry for Children, 45(5), 396-402.
- Nesbitt, R. E. & Wilson, T. D. (1977). Telling more than we can know: Verbal reports on verbal processes. Psychological Review, 84, 231-259.
- Nocella, J. & Kaplan, R. M. (1982). Training children to cope with dental treatment. Journal of Pediatric Psychology, 7(2), 175-178.
- Norton, D. W. (1952). An empirical observation of some effects of nonnormality and heterogeneity on the F-distribution. Unpublished Doctoral Dissertation, State University of Iowa.
- Peterson, L., & Shigetomi, C. (1981). The use of coping techniques to minimize anxiety in hospitalized children. Behavior Therapy, 12(1), 1-14.
- Petrov, P. (1965). Psychostomatological methods. The British Journal of Medical Hypnotism, 17(1), 30-36.
- Petrov, P., Traikov, D., Kalengiev, T. Z., & Sharankov, V. (1964). A contribution to psychoanesthetization through hypnosis in some stomatological manipulations. The British Journal of Medical Hypnotism, 15, p.8.
- Pollack, S. (1966). Pain control by suggestion. Journal of Oral Medicine, 21(2), 89-95.

- Pinkham, J. R., & Schroeder, C. S. (1975). Dentist and psychologist: Practical consideration for a team approach to the intensely anxious dental patient. The Journal of the American Dental Association, 90, 1022-1025.
- Price, D. D., & Barber, J. B. (1987). An analysis of factors that contribute to the efficacy of hypnotic analgesia, Journal of Abnormal Psychology, 96 (1), 46-51.
- Raginsky, B. B. (1968). Some aspects of psychology applied to dentistry. Journal of the Canadian Dental Association, 34 (2), 73-78.
- Rankin, M. A., & Harris, M. B. (1984). Dental anxiety: The patient's point of view. The Journal of the American Dental Association, 109, 43-47.
- Rombom, H. M. (1981). Behavioral techniques in pedodontics: The hand-over-mouth technique. The Journal of Dentistry for Children, 48 (3), 208-210.
- Rosengarten, M. (1961). The behavior of the preschool child at the initial dental visit. Journal of Dental Research, 40, 673.
- Ross, P. J. (1981). The history of hypnosis in dentistry. Bulletin of the History of Dentistry, 29(1), 24-28.
- Savage, R. D., & MacGregor, A. R. (1970). Behavior therapy in prosthodontics. Journal of Prosthetic Dentistry, 24, 126-132.
- Sax, S., & Zoeller, G. (1979). The dental relaxation method. Journal of the Missouri Dental Association, 59(7), 18-21.
- Schey, L. (1976). Effectiveness of hypnosis on reducing dental anxiety. Dental Hygiene, 50, 115-119.
- Scott, D. S., Hirschman, R., & Schroder, K. (1984). Historical antecedents of dental anxiety. The Journal of the American Dental Association, 108(1), 42-45.
- Sector, I. I. (1960). Some notes on controlling the exaggerated gag reflex. American Journal of Clinical Hypnosis, 2, 149-153.

- Seeman, K., & Molin, C. (1976). Psychopathology, feelings of confinement and helplessness in the dental chair, and relationship to the dentist in patients with disproportionate dental anxiety (DDA). Acta Psychiatrica Scandinavica, 54, 81-91.
- Selye, H. (1974). Stress without distress. Scarborough, ON: Signet Books.
- Shaw, D. W., & Thoresen, C. E. (1974). Effects of modeling and desensitization in reducing dental phobia. Journal of Consulting and Clinical Psychology, 21, 415-420.
- Shoben, E. J., & Borland, L. (1954). An empirical study of the etiology of dental fears. Journal of Clinical Psychology, 10, 171-174.
- Siegel, L. J., & Peterson, L. (1980). Stress reduction in young dental patients through coping skills and sensory information. Journal of Consulting and Clinical Psychology, 48, 785- 787.
- SIFO (1962). Svenska institutet for opinionsundersoknugar - Tanklkarbesok Interjuundersokning for tandrarnet. Stockholm.
- Sime, A. M. (1976). Relationship of preoperative fear, type of coping, and information received about surgery to recovery from surgery. Journal of Personality and Social Psychology, 34, 716-724.
- Sokol, D. J., Sokol, S. & Sokol, C. K. (1985). A review of non-intrusive therapies used to deal with anxiety and pain in the dental office. The Journal of the American Dental Association, 110, 217-222.
- Snow, L. (1979). The relationship between "rapid induction" and placebo analgesia, hypnotic susceptibility, and chronic pain intensity. Dissertation Abstracts International, 40, 937.
- Stolzenburg, J. (1955). Clinical application of hypnosis in producing hypno-anesthesia control of hemorrhage and salivation during surgery: A case report. Journal of Clinical and Experimental Hypnosis, 3, 24-27.
- Stolzenburg, J. (1961). Age regression in the treatment of two instances of dental phobia American Journal of Clinical Hypnosis, 4, 122-123.

- Stone, J. A., & Lundy, R. M. (1985). Behavior compliance with direct and indirect body movement suggestions. Journal of Abnormal Psychology, 94, 256-263.
- Strosberg, I. M. (1972). Psychodynamics for the hypnodontist. Journal of the American Society of Psychosomatic Dentistry and Medicine, 19(1), 28-34.
- Tan, S. Y., & Poser, E. G. (1982). Acute pain in a clinical setting: effects of cognitive behavioral skills training. Behavior Research and Therapy, 20, 535-545.
- Thomas, K. A. (1929). Psychology and the management of nervous patients and patients in general. Dentistry News, 12, 3-9.
- Tinkler, S. (1971). The uses of hypnosis in dental surgery. In J. Hartland (Ed.), Medical and dental hypnosis (2nd ed, Chapter 24). London: Bailliere Tindall.
- VanGorp, W. G., Meyer, R. G., & Dunbar, K. D. (1985). The efficacy of direct versus indirect hypnotic induction techniques on reduction of experimental pain. The International Journal of Clinical and Experimental Hypnosis, 33(4), 319-328.
- Venham, L. L. (1977). T. V. helps young patients relax. Dental Survey, 53, 98.
- Wallis, C. J. B. (1883). Influence of mind over body. The Dental Record, 8(4), 145.
- Wardle, J. (1982). Fear of dentistry. The British Journal of Medical Psychology, 55, 119-126.
- Watzlawick, P. (1978). The Language of Change. New York: Basic Books.
- Weiner, A. A. (1980). The basic principles of fear, anxiety, and phobias as they relate to the dental visit. Quintessence International, 9(9), 119-123.
- Weiner, A. A. (1980). The clinical treatment of fear, anxiety, and phobias. Quintessence International, 11(10), 69-78.
- Weinstein, P., Smith, T. A., & Bartlett, R. C. (1973). A study of the dental patient relationship. Journal of Dental Research, 52, 1287.
- Weisenberg, M. (1973). Behavioral motivation. Journal of Periodontology, 44, 489-499.

- Weisenberg, M. Kreindler, M., & Schachat, R. (1974). Relationship of the dental anxiety scale to the state-trait anxiety inventory. Journal of Dental Research, 53, 946.
- Weisenberg, M., Kereindler, M. L., Schachat, R., and Werboff, J. (1976). Interpreting palmar sweat prints: not-so-simple measure. Journal of Psychosomatic Research, 20, 1-6.
- Wepman, B. J. (1978). Psychological components of pain perception. Dental Clinics of North America, 22(1), 101-113.
- White, W. C., Akers, J., Green, J., & Yates, D. (1974). Use of imitation in the treatment of dental phobia in early childhood: A preliminary report. Journal of Dentistry for Children, 41, 106-110.
- Wolpe, J. (1958). Psychotherapy by reciprocal inhibition. Stanford, CA: Stanford University Press.
- Woolson, D. A. (1986). An experimental comparison of direct and Ericksonian hypnotic induction procedures and the relationship to secondary suggestibility. American Journal of Clinical Hypnosis, 29(1), 23-28.
- Wright, F. A. C., & Lange, D. E. (1978). The management of dental phobias. New Zealand Dental Journal, 74, 210-214.
- Yagiela, J. A. (1985). Local anesthetics: A century of progress. Anesthesia Progress, 32(2), 47-56.
- Yapko, M. D. (1983). A Comparative analysis of direct and indirect hypnotic communication styles. American Journal of Clinical Hypnosis, 25(4), 270-276.
- Zachary, R. A., Friedlans, S., Huang, L. N., Silverst, S., Leggott, P. (1985). Effects of stress-related and stress irrelevant filmed modeling on children's responses to dental treatment. Journal of Pediatric Psychology, 10(4), 383-401.
- Zeig, J. (1980). Symptom prescription techniques: A clinical application using elements of communication. American Journal of Clinical Hypnosis, 33, 23-33.

APPENDIX I: Introductions

Live Presentation Hypnotherapy Groups

I am conducting an experiment to determine the effectiveness of a procedure that is intended to make people feel more comfortable and relaxed during their dental treatment. The procedure involves a kind of hypnosis and requires about 20 minutes before your dental treatment. I understand that you have a dental appointment on _____ at _____ and I would appreciate your involvement if you can. Would you be willing to take part?

Taped Presentation Hypnotherapy Groups

I am conducting an experiment to determine the effectiveness of a procedure that is intended to make people feel more comfortable and relaxed during their dental treatment. The procedure involves a kind of hypnosis and requires about 20 minutes before your dental treatment. The procedure is played to you on a tape. I understand that you have a dental appointment on _____ at _____ and I would appreciate your involvement if you can. Would you be willing to take part?

Control Group

I am conducting an experiment to determine the effectiveness of procedures that are intended to make people feel more comfortable and relaxed during their dental treatment. I'm requesting several of the dentist's patients to fill out some brief questionnaires about their experiences before and during dental treatment. I would appreciate your involvement by answering some questions for me. Would you be willing to answer some questions for me?

APPENDIX II: Consent Form

I, _____ freely and voluntarily and without undue inducement or any element of coercion consent to be a participant in this research project. The procedures to be followed, and their purposes have been explained to me. As I understand it, the study is concerned with the prevention and relief of discomfort normally caused by dental treatment. In order to assist in obtaining information I may be requested to complete questionnaires.

I understand that this consent and data collected on me may be withdrawn at any time without prejudice. I also realize that all information is strictly confidential. Although findings may be published in scientific journals, there will be no identification of me personally in these papers. All information will remain strictly anonymous.

I have been given the right to ask and have received answers on any inquiry concerning the research. Questions, if any, have been answered to my satisfaction. I have read and understood the foregoing.

Witness

Research Participant

I, R. P. Haines, certify that I have explained to the above mentioned patient the nature of the research study, and that the patient has the option of withdrawing from the study at any time.

(signature)

APPENDIX III: The CDAS

Please circle a letter designating your answer to the following four questions.
If you had to go to the dentist tomorrow, how would you feel about it?

- a) I would look forward to it as a reasonably enjoyable experience.
- b) I wouldn't care one way or the other.
- c) I would be a little uneasy about it.
- d) I would be afraid that it would be unpleasant and painful.
- e) I would be very frightened of what the dentist might do.

When you are waiting in the dentist's office for your turn in the chair, how do you feel?

- a) Relaxed
- b) A little uneasy.
- c) Tense.
- d) Anxious.
- e) So anxious that I sometimes break out in a sweat or almost feel physically sick.

When you are in the dentist's chair waiting while he or she gets the drill ready to begin working on your teeth, how do you feel?

- a) Relaxed
- b) A little uneasy.
- c) Tense.
- d) Anxious.
- e) So anxious that I sometimes break out in a sweat or almost feel physically sick.

You are in the dentist's chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments that will be used to scrape your teeth around the gums, how do you feel?

- a) Relaxed
- b) A little uneasy.
- c) Tense.
- d) Anxious.
- e) So anxious that I sometimes break out in a sweat or almost feel physically sick.

APPENDIX IV: Dental History Questionnaire

Name _____ Age _____ SEX M or F (Please Circle)

Have you been to dentist, dental specialist, or dental hygienist for treatment before? _____

How old were you when you first visited a dental office? _____ years old. Don't remember _____

On your first visit did you receive dental treatment? _____ Don't remember _____

Do you have any memories of awful experiences while receiving dental treatment? _____ If so, when? _____ and please describe briefly on the line below.

When was the last time that you visited a dentist or hygienist for treatment?

Have you ever avoided or delayed visiting the dentist due to fear or the anticipation of discomfort?

_____ financial reasons? _____?

Have any dentists caused you to feel uncomfortable, anxious, or more uncomfortable than you would have felt otherwise? _____ If so, how? _____

Other comments? If so, please write on the line below.

APPENDIX V: Chi-Square Statistics on Dental History Questions

TABLE 1 Summary of "YES" and "NO" Responses, Chi-Squares, and Significance Levels of Four Dental History Questions of the Five Groups

Question									
	1		2		3		4		
Group	YES	NO	YES	NO	YES	NO	YES	NO	
Indirect Taped	11	5	14	6	7	13	11	9	
Direct Live	11	2	12	8	8	12	9	11	
Indirect Live	11	5	12	7	12	8	9	11	
Control	12	5	14	6	6	14	12	8	
Direct Taped	9	2	12	8	9	11	10	10	
Chi-Squared=	1.67		0.90		4.35		1.36		
Significance(p)=	0.80		0.92		0.36		0.85		

APPENDIX VI: Summary and ANOVA Statistics on Pre-Experimental Measures

TABLE 2. Summary of Means, Standard Deviations, Minimums and Maximums of Age by Group

Group	N	Mean	SD	Minimum	Maximum
Indirect Taped	20	35.05	8.27	22	56
Direct Live	20	39.20	11.51	24	65
Indirect Live	20	34.20	13.51	18	55
Control	20	36.00	14.41	20	80
Direct Taped	20	38.05	10.96	24	66
Total	100	36.50	11.83	18	80

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	346.70	86.67	.610	.657
Within Groups	95	13510.30	142.21		
Total	99	13857.00			

TABLE 3. Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Age at First Dental Visit by Group

Group	N	Mean	SD	Minimum	Maximum
Indirect Taped	20	8.30	3.85	4	18
Direct Live	17	8.82	3.78	5	18
Indirect Live	14	9.71	5.37	5	23
Control	17	8.35	4.40	3	22
Direct Taped	15	11.27	9.25	4	39
Total	83	9.19	5.51	3	39

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	98.57	24.64	.803	.527
Within Groups	78	2394.34	30.70		
Total	82	2492.92			

TABLE 4. Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Time Since Last Visit by Group

Group	N	Mean	SD	Minimum	Maximum
Indirect Taped	20	.36	.89	.02	4
Direct Live	20	.53	.82	.02	3
Indirect Live	20	1.08	2.23	.02	8
Control	20	1.07	1.65	.02	6
Direct Taped	20	.43	.77	.02	3
Total	100	.69	1.41	.02	8

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	10.01	2.50	1.28	.285
Within Groups	95	186.15	1.96		
Total	99	196.15			

APPENDIX VI(CONTINUED)

TABLE 5. Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Pre-Treatment CDAS Scores by Group

Group	N	Mean	SD	Minimum	Maximum
Indirect Taped	20	10.25	2.38	8	16
Direct Live	20	10.00	1.84	8	13
Indirect Live	20	9.75	2.12	8	16
Control	20	9.90	2.24	8	15
Direct Taped	20	9.30	1.89	8	15
Total	100	9.84	2.09	8	16

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	9.94	2.49	.560	.682
Within Groups	95	421.50	4.44		
Total	99	431.44			

TABLE 6. Summary of Means, Standard Deviations, Minimums and Maximums, and Analysis of Variance of Trait Anxiety(STAI) by Group

Group	N	Mean	SD	Minimum	Maximum
Indirect Taped	20	35.00	7.57	23	55
Direct Live	20	37.75	7.65	25	53
Indirect Live	20	32.75	6.07	20	49
Control	20	36.35	6.89	24	48
Direct Taped	20	32.95	7.13	20	48
Total	100	34.96	7.21	20	55

Analysis of Variance

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	4	372.84	93.21	1.857	.1244
Within Groups	95	4769.00	50.20		
Total	99	5141.84			

APPENDIX VII: Dentist's Questionnaire and Rating Scale

Date: _____ Patient's Name: _____ Sex: M or F

Dental treatment undertaken during this appointment _____

Duration of appointment _____

Medications Used: Anesthetics? _____ Others? _____

	low					comfort				high
How comfortable was your patient during the session?:	1	2	3	4	5	6	7	8	9	10
How much pain do you think your patient experienced?:	1	2	3	4	5	6	7	8	9	10
How cooperative was your patient during the session?:	1	2	3	4	5	6	7	8	9	10

Comments? _____

Thank-You

APPENDIX VIII: Dental Assistant's Rating Scale

Patient's Name: _____ Date: _____

Duration of Appointment _____

	low				comfort				high	
How comfortable was this patient during treatment?	1	2	3	4	5	6	7	8	9	10
	low				pain				high	
How much pain do you think this patient experienced?	1	2	3	4	5	6	7	8	9	10
	low				cooperativeness				high	
How cooperative was this patient during treatment?	1	2	3	4	5	6	7	8	9	10

Comments?

Thank-You

APPENDIX IX: Patient's Rating Scale

Patient's Name: _____ Date: _____

Please circle one number for each question

How much did you enjoy the preparation before treatment?	didn't enjoy enjoyed 1 2 3 4 5 6 7 8 9 10
How forced or pushy was the message to feel comfortable?	forced not forced 1 2 3 4 5 6 7 8 9 10
How comfortable were you during the dentistry?	comfortable not comfortable 1 2 3 4 5 6 7 8 9 10
How much pain did you experience during treatment?	low pain high 1 2 3 4 5 6 7 8 9 10
How much fear did you experience during treatment?	low fear high 1 2 3 4 5 6 7 8 9 10

Would you like such preparation for dental treatment again before your next appointment?

Yes or No (Circle One).

Comments?

Thank you

APPENDIX X: Dental Fear Survey

Please rate the following statements by circling your choice of 1, 2, 3, 4, or 5.

1. I would avoid calling for a dental appointment	1	never	2	3	often	4	5
2. I would cancel or not appeared	1		2	3		4	5

During dental treatment I experienced

		none			great
3. Muscle tension	1	2	3	4	5
4. Increased breathing	1	2	3	4	5
5. Increased perspiration	1	2	3	4	5
6. Nausea	1	2	3	4	5
7. Increased Heart Rate	1	2	3	4	5
8. Increased salivation from the mouth	1	2	3	4	5

I would feel fear:

<u>How would you feel fear:</u>		none		great	
9. Making an appointment	1	2	3	4	5
10. Approaching the office	1	2	3	4	5
11. In the waiting room	1	2	3	4	5
12. In the dental chair	1	2	3	4	5
13. When I smell the office	1	2	3	4	5
14. When I see the dentist	1	2	3	4	5
15. When I see the needle	1	2	3	4	5
16. When I feel the needle	1	2	3	4	5
17. When I see the drill	1	2	3	4	5
18. When I hear the drill	1	2	3	4	5
19. When I feel the drill	1	2	3	4	5
20. When I feel I'm going to gag	1	2	3	4	5
21. While having my teeth cleaned	1	2	3	4	5
22. When there is pain even after the anesthetic	1	2	3	4	5

23. Generally, how fearful are you of dentistry at this time

		very			not very	
	1	2	3	4	5	
23. Generally, how fearful are you of dentistry at this time						
24. How fearful was your mother	1	2	3	4	5	
25. How fearful was your father	1	2	3	4	5	
26. How fearful were your brothers and sisters	1	2	3	4	5	
27. How fearful were your childhood friends	1	2	3	4	5	

APPENDIX XI: MANCOVA Summary

Table 17. Group Effects: Multivariate Tests of Significance with Appointment Time as a Covariate(S = 4, M = 4, N = 40)

Test Name	Value	Approximate F	Hypothesis DF	Error DF	Significance of F
Pillais	.8141	1.533	56.00	336.00	<.05
Hotellings	1.1271	1.600	56.00	318.00	<.01
Wilks	.3866	1.568	56.00	317.25	<.01
Roys	.3730				<.01

APPENDIX XII: ANCOVA Summaries

Table 18. Summary of Univariate Analyses of Covariance on 14 Dependent Variables With Appointment Time as a Covariate

Variable	Treatment MS	Error MS	F	Significance of F
Post-CDAS	31.6365	5.9622	5.3062	.001
DACom	8.7590	6.5918	1.3288	.138
DAPain	5.8440	3.9274	1.4880	.106
DFSav	3.8573	1.5010	2.5697	.022
DFSphys	79.8052	13.8723	5.7529	.000
DFSfq	3.7192	.9020	4.1232	.002
DFScog	637.2905	95.8381	6.6497	.000
Meds	1.8382	1.3661	1.3456	.130
DentCom	7.2153	2.8315	2.5482	.022
DentPa	5.8960	3.4124	1.7278	.075
PaComf	9.3708	4.6832	2.0009	.051
PaPain	6.7861	3.5523	1.9104	.058
PaFear	5.7661	5.6757	1.0159	.202
GSRD	90.4708	28.5538	3.1684	.009

*one-tailed

APPENDIX XIII: Direct Induction

Introductory Remarks

In a moment I shall hypnotize you and suggest to you a number of experiences which you may or may not have, and a number of effects which you may or may not produce. Not everyone can have the same experiences or produce the same effects when hypnotized. People vary greatly. We need to make you as comfortable and relaxed as you can feel.

Induction

O. K., to begin now, sit comfortably. Take time to find a comfortable position ... And now, take a deep, relaxing breath and start experiencing warmth in your neck and shoulders. Take four more deep, relaxing breaths and realize how relaxed your shoulders are. Now, please close your eyes and listen carefully to what I say. As we go on, you will find yourself becoming more and more relaxed, more and more comfortable ... Begin to let your whole body relax. ... Now, let all the muscles go limp ... and in a moment you will be able to feel special muscle groups relaxing even more. I want you to pay attention to your right foot, you can feel the muscles in it relax ... feel the muscles in the right lower leg relaxing. ... in the right upper leg relaxing ... and then focus on the left side, on the left side concentrate on the way that the left foot is relaxing ... and the left leg, how the lower part and the upper part are both relaxing more ... Next, you'll be able to feel the muscles of the right hand relaxing, the right lower arm and the right upper arm relaxing ... and then I want you to direct your attention to your left hand. Let your left hand relax, and let the lower arm and the upper arm relax ... As you become relaxed, your body begins to feel rather heavy. Just think of the chair as being strong, sink into it, and let it hold you ... Your shoulders ... neck ... and head, more and more relaxed ... The muscles of your scalp and forehead, just let them relax even more ... and all of this time you have been settling more deeply and more comfortably into the chair. Just allow yourself to settle more comfortably into the chair.

And your mind has relaxed, too, along with your body. It is possible to set all worries aside. Just don't worry. Your mind is calm and peaceful. You are getting more and more

comfortable . . . And you'll continue to feel pleasantly relaxed as you continue to listen to my voice . . . Just keep your concentration and keep your thoughts on what I am saying . . . more and more deeply relaxed and very drowsy, but at no time will you have any trouble hearing me. You'll continue in this state of great relaxation until I suggest that it is time for you to become more alert . . .

Now I want you to imagine a pathway, a pathway with twenty steps and you at the beginning looking down along the path. Soon I'm going to count from one to twenty. And as I count you will find yourself going down further and further, into this deeply relaxed, hypnotic state, as you take each step. You will imagine yourself taking one step along the pathway with each number that I count. You will see yourself and feel yourself stepping along the pathway. Later, you'll be able to do all sorts of things that I suggest, things that will be interesting and acceptable to you. And you will be able to do them without breaking the pattern of complete relaxation that's gradually coming over you. You'll be able to retain that focus. . . Now get ready to go along the pathway . . . Take one step along the pathway -- you're becoming more deeply, deeply relaxed . . . two, two steps along the pathway now -- down into a more tranquil, deeper, tranquil state of mind . . . Three, three steps along the pathway . . . and now you can realize that you are feeling more relaxed . . . feeling relaxed in your shoulders and your neck . . . feeling relaxed in your arms and your legs . . . Just letting yourself feel comfortable in all those muscles. And then take a fourth step along the pathway . . . and you can begin to feel more relaxation in your body . . . you experience a deep relaxing, restful heaviness in your forehead . . . and just let that spread to your eye, across your face, into your mouth and jaw . . . down through your neck . . . feel the deep, heavy, and restful relaxation. Then go to the fifth step along the pathway -- and I want you to really begin to enjoy your relaxation and comfort. Six, six steps along the pathway -- feel more and more relaxed and comfortable as you go. Take the seventh step now, along the pathway . . . and experience a heavy, relaxing, comfortable feeling spread into your shoulders and your arms. Let your arms become very heavy, very comfortable and heavy . . . and become more aware of that heaviness. Focus on that heaviness. Go on to the eighth step along the pathway and continue to experience deep relaxation as you get farther along. Take the ninth step along the pathway and breathe

deeply, comfortably, and slowly. Feel restful, and allow heaviness to sink in and become even more deeply relaxed. Ten, on to the tenth step along the pathway, the halfway point . . . and just let yourself become more deeply relaxed and comfortable. Focus on how you feel . . . comfortable and relaxed. Then take the eleventh step along the pathway . . . feel heavier, feel more comfortable, and don't let anything bother you or disturb you. Just become more deeply and deeply relaxed. And go on to the twelfth step along the pathway . . . and just focus your attention on my voice. I want you to notice how easily you can easily understand me and not let anything bother you. And take a thirteenth step along the pathway. Thirteen steps along now. Begin to enjoy the sensations of relaxation and comfort. Take the fourteenth step . . . and let yourself sink down deeply into the chair. Sink deeply into the chair and allow nothing to bother or disturb you. Let that chair hold you comfortably and warmly. And then go on to the fifteenth step . . . feel more deeply relaxed . . . and enjoy those sensations of relaxation . . . Take sixteen steps along the pathway . . . and be prepared to feel more deeply and deeply relaxed . . . feel more and more comfortable . . . don't let anything bother you or disturb you . . . And then go on to the seventeenth step along the pathway, . . . seventeen steps . . . and as you are getting closer to the end, just let your arms and legs get heavier, more comfortable, as you get closer to the end of that pathway. Fully enjoy the experiences of heaviness, comfort, and relaxation. And now take the eighteenth step along the pathway . . . and feel even heavier . . . heavier and more comfortable. Begin to feel very restful and relaxed. Let yourself become as heavy as possible . . . really relaxed and heavy. Your entire body now is becoming heavier and more comfortable. Take the nineteenth step along the pathway. And don't let anything bother you or disturb you as you make your way along, and feel more and more comfortable . . . more and more relaxed . . . more and more rested. Then go to twenty, the end of the pathway. Feel more deeply and deeply relaxed with every breath that you take. You are completely relaxed now.

You can change your position any time that you wish. Just make sure you're comfortable and relaxed. Just make sure that you stay comfortable and relaxed. You are very relaxed and pleasantly hypnotized. While you remain comfortably listening to my words, I am going to tell you

some things to do. Some things that will be acceptable to you. Pay close attention to what I tell you, and think about the things I suggest. Then just let happen whatever you find is happening.

First of all, I want you to forget something. I want you to have trouble digging up certain memories of something in the future. I want you to forget some the things we talked about today and let those things stay quietly in the back of your mind . . . just like you'd forget what you had for lunch a month ago today, and just let that stay quietly in the back of your mind. I want you to forget some of the things that we talked about today, and just let some of those things be recalled some other time. You might remember the things you heard today in a few days, or maybe next week or a month from now, but for now I'd like you to forget what we talked about.

Secondly, today I want you to be surprised that your visit here today is pleasant and comfortable. I want you to be pleased and surprised that your visit here is more comfortable than you thought it would be, that you'll notice how pleased and surprised you are when your head rests back against the headrest . . . you'll be pleased and surprised, when your head rests back against the headrest . . . you will feel surprised and be reminded about how very comfortable you are feeling right now . . . I want you to feel comfortable and relaxed and not let anything bother or disturb you. The experience of relaxation and comfort will come back to you when you are about to sit down in the dental chair. When you're about to sit down in the chair, you'll notice how pleased or surprised you'll feel, how very comfortable you feel whenb you sit down in the dental chair. You'll be pleased at how pleasant, comfortable, and restful you feel at that time. You won't let anything bother or disturb you . . . You won't feel anything . . . you will let yourself become totally relaxed . . . totally comfortable and restful. Also, whenever the dentist touches your right shoulder, or whenever I touch your right shoulder you will feel like closing your eyes, and you will feel more comfortable and relaxed. Whenever I or the dentist touches your right shoulder, you'll be ready to feel more comfortable and relaxed. Then you won't let anything bother you or disturb you. You will just become more heavy and relaxed, and not allow anything to disturb you when either I or the dentist touches your right shoulder. Then you'll just feel more comfortable and

relaxed. You'll feel deeply comfortable and relaxed. You'll feel at least as comfortable and relaxed as you do now.

And I want you to realize again how very nice it feels to be as relaxed and comfortable as you are right now. Soon I'm going to begin from twenty to one, to count down. When I do I want you to become more alert as you go back along the pathway, one step at a time. You will feel yourself going back along the pathway slowly and comfortably . . . and you will become more alert with each step I count. When I reach three your eyes will be ready to open . . . when I reach two, they will open . . . and, when I reach one, you'll become alert, awake, and refreshed, and feeling very well. Just take your time going back along that pathway. Also, I don't want you to experience this totally relaxed and restful, comfortable feeling when you need to be alert, like if you drive or you have to be totally on top of things . . . then you won't feel totally restful and relaxed. You'll be alert and feeling very well. O. K., now you'll begin to get ready to go back along the pathway.

Twenty . . . Nineteen . . . Eighteen . . . feel yourself going back along the pathway . . . Seventeen . . . Sixteen . . . Fifteen . . . a quarter of the way back along now, becoming more and more alert, feel yourself becoming more and more alert . . . Fourteen . . . Thirteen . . . Twelve . . . Eleven . . . Ten . . . now you're halfway back along the pathway . . . becoming more and more alert . . . comfortable, but more and more alert . . . Nine . . . that's right, feel yourself becoming more and more alert . . . Eight . . . Seven . . . Six . . . Five . . . Four . . . Three . . . that's right . . . Two . . . and . . . One . . . that's right, open your eyes, become wide awake, alert, relaxed, and refreshed . . . that's fine.

APPENDIX XIV: Indirect Induction

Elicitation of cooperation

Since you're here I presume you'd like to feel more comfortable than you do right now? Well, I'm quite sure that, as you listen to this tape it will seem to you that I've really done nothing, that nothing has happened at all. You might feel a bit more relaxed in a moment, but I doubt that you'll notice any other changes. I'd like you to notice though, if you're surprised by anything else you might notice.

OK, then . . . the really best way to begin feeling more comfortable is to just begin by sitting as comfortably as you can right now . . . go ahead and adjust yourself to the most comfortable position you like . . . fine. Now, I'd like you to notice how much more comfortable you can feel by just taking one very big, satisfying, deep breath. Go ahead . . . big, deep, satisfying breath . . . that's fine. You may already notice how good that feels . . . how warm your neck and shoulders can feel . . . Now, then . . . I'd like you to take four more very deep, very comfortable breaths, and, as you exhale, notice . . . just notice how comfortable your eyes can feel when they close . . . and when they close, just let them stay closed . . . that's right, just notice that. . . and notice, too, how, when you exhale, you can just feel that relaxation beginning to sink in . . . Good, that's fine . . . now, as you continue breathing, comfortably and deeply and rhythmically, all I'd like you to do is to picture in your mind . . . just imagine a pathway, any kind you like, any place you like . . . just a pathway with 20 steps, and you at the beginning . . . Now you don't need to see all 20 steps at once, you can see any or all of the pathway, any way that you like . . . You may experience it by, seeing it, or feeling it, or hearing it. However, you notice that it's fine. Now, in a moment, but not yet, I'm going to begin to count, out loud, from one to 20, and . . . as you may have already guessed . . . as I count each number I'd like you to take a step along that pathway . . . one step for each number that I count . . . the larger the number, the farther along the pathway . . . the farther along the pathway, the more comfortable you can feel . . . one step for each number . . . alright, you can begin to get ready . . . one . . . one step along the pathway . . . two . . . two steps along the

pathway . . . that's fine . . . THREE . . . three steps along the pathway . . . and maybe you already notice how much more relaxed you can feel . . . I wonder if there are places in your body that feel more relaxed than others . . . perhaps your shoulders feel more relaxed than your neck . . . perhaps your legs feel more relaxed than your arms . . . I don't know and it really doesn't matter . . . all that matters is that you feel comfortable . . . that's all . . . FOUR . . . four steps along the pathway, perhaps feeling already places in your body beginning to relax . . . I wonder if the deep relaxing, restful heaviness of your forehead is already beginning to spread and flow . . . down, across your eyes, down across your face, into your mouth and jaw . . . down through your neck, deep, restful, heavy . . . FIVE . . . a quarter of the way along, and already beginning, perhaps, to really, really enjoy your relaxation and comfort . . . SIX . . . six steps along the pathway . . . perhaps beginning to notice that the sounds which were distracting become less so . . . that all the sounds you can hear become a part of your experience of comfort and relaxation . . . anything you can notice becomes a part of your experience of comfort and relaxation . . . SEVEN . . . seven steps along the pathway . . . maybe noticing the heavy, restful, comfortably relaxing feeling spreading down into your shoulders, into your arms . . . I wonder if you notice one arm feeling heavier than the other . . . perhaps your left arm feels heavier than your right . . . perhaps your right arm feels heavier than your left . . . I don't know, perhaps they both feel equally, comfortably heavy . . . It really doesn't matter . . . just letting yourself become more and more aware of that comfortable heaviness, or is it a feeling of lightness? . . . I really don't know, and it really doesn't matter . . . EIGHT . . . eight along the pathway . . . perhaps noticing that, even as you relax, your heart seems to beat much faster and harder than you might expect, perhaps noticing the tingling in your fingers . . . perhaps wondering about the fluttering of your heavy eyelids . . . NINE . . . nine steps along the pathway, breathing comfortably, slowly, and deeply. . . restful, noticing that heaviness really beginning to sink in, as you continue to notice the pleasant, restful, comfortable, relaxation just spread through your body . . . TEN . . . halfway to the end of the path, wondering perhaps what might be happening, perhaps wondering if anything at all is happening . . . and yet, knowing that it really doesn't matter, feeling so pleasantly restful, just continuing to notice the growing, spreading,

comfortable relaxation . . . ELEVEN . . . eleven steps along the pathway . . . noticing maybe that as you feel increasingly heavy, more and more comfortable, there's nothing to bother you, nothing to disturb you, as you become deeper and deeper relaxed . . . TWELVE . . . I wonder if you notice how easily you can hear the sound of my voice . . . how easily you can understand the words I say . . . with nothing to bother, nothing to disturb . . . THIRTEEN . . . thirteen steps along the pathway, feeling more and more the real enjoyment of this relaxation and comfort . . . FOURTEEN . . . fourteen steps along the pathway . . . noticing perhaps the sinking, restful pleasantness as your body seems to just sink down, deeper and deeper into the chair, with nothing to bother, nothing to disturb . . . as though the chair holds you, comfortably and warmly . . . FIFTEEN . . . three-quarters of the way along the pathway now . . . deeper and deeper relaxed, absolutely nothing at all to do . . . but just enjoy yourself . . . SIXTEEN . . . wondering perhaps what to experience at the end of the pathway . . . and yet knowing how much more ready you feel to become deeper and deeper relaxed . . . more and more comfortable, with nothing to bother, nothing to disturb . . . SEVENTEEN . . . seventeen steps along the pathway . . . closer and closer to the end, perhaps feeling your heart beating harder, perhaps feeling the heaviness in your arms and legs become even more clearly comfortable . . . knowing that nothing really matters except your enjoyment and your experience of comfortable relaxation, with nothing to bother, nothing to disturb . . . EIGHTEEN . . . eighteen steps along the pathway . . . almost to the end, with nothing to bother, nothing to disturb, as you continue to go deeper and deeper relaxed . . . heavy . . . comfortable, restful, relaxed . . . nothing really to do, no one to please, no one to satisfy . . . just to notice how very comfortable and heavy you can feel, and continue to feel as you continue to breathe, slowly and comfortably . . . restfully . . . NINETEEN . . . nineteen steps . . . nothing to bother, nothing to disturb you as you continue to feel more and more comfortable, more and more relaxed, more and more rested, more and more comfortable . . . just noticing . . . and now . . . TWENTY . . . end of the pathway . . . deeply, deeply relaxed . . . deeper with every breath you take . . . as I talk to you for a moment about something you already know a lot about . . . remembering and forgetting . . . you know a lot about it, because we all do a lot of it . . . every moment of every day you remember . . .

and then you forget, so you can remember something else . . . you can't remember everything, all at once, so you let some memories move quietly back in your mind . . . I wonder, for instance, if you remember what you had for lunch yesterday . . . I would guess that, without too much effort, you can remember what you had for lunch yesterday . . . and yet . . . I wonder if you remember what you had for lunch a month ago today . . . I would guess that the effort is really too great to dig up that memory, though of course it is there . . . somewhere, deep in the back of your mind . . . no need to remember, so you don't . . . and I wonder if you'll be pleased to notice that the things we talk about today, with your eyes closed, are the things which you'll remember tomorrow, or the next day . . . or next week . . . I wonder if you'll decide to let the memory of these things rest quietly in the back of your mind . . . or if you'll remember gradually, a bit at a time . . . or perhaps all at once, to be again resting in the back of your mind . . . perhaps you'll be surprised to notice that it is more comfortable to remember on another day altogether . . . it really doesn't matter . . . doesn't matter at all . . . whatever you do, however you choose to remember . . . is just fine . . . absolutely natural . . . doesn't matter at all . . . whether you remember tomorrow or the next day, whether you remember all at once, or gradually . . . completely or only partially . . . whether you let the memory rest quietly and comfortably in the back of your mind . . . really doesn't matter at all . . . and, too, I wonder if you'll notice that you'll feel surprised that your visit here today is so much more pleasant and comfortable than you might have expected . . . I wonder if you'll notice that surprise . . . that there are no other feelings . . . perhaps you'll feel curious about the surprise . . . surprise, curiosity . . . I wonder if you'll be pleased to notice that today . . . and any day . . . whenever you feel your head resting back against the headrest . . . when you feel your head resting back . . . you'll feel reminded of how very comfortable you are feeling right now . . . even more comfortable than you feel even now . . . comfortable, relaxed . . . nothing to bother, nothing to disturb . . . I wonder if you'll be reminded of this comfort, too, and this relaxation, by just noticing the brightness of the light up above . . . perhaps this comfort and relaxation will come flooding back, quickly and automatically, whenever you find yourself beginning to sit down in the dental chair . . . I don't know exactly how it will seem . . . I only know, as perhaps you also know . . . that your experience will seem surprisingly

more pleasant, surprisingly more comfortable, surprisingly more restful than you might expect . . .
 with nothing to bother, nothing to disturb . . . whatever you are able to notice . . . everything can
 be a part of your comfortableness, restfulness and restfulness and relaxation . . . everything you
 notice can be a part of being absolutely comfortable . . . and I want to remind you that whenever
 the dentist touches your right shoulder, . . . you'll experience a feeling . . . a feeling of being ready
 to do something . . . whenever I touch your right shoulder, like this, or whenever the dentist
 touches your right shoulder, you'll experience a feeling of being ready to do something . . .
 perhaps a feeling of being ready to close your eyes . . . perhaps a feeling of being ready to be
 even more comfortable . . . perhaps ready to know even more clearly that there's nothing to
 bother, nothing to disturb . . . perhaps ready to become heavy and tired . . . I don't know . . . but
 whenever I touch your right shoulder, like this . . . you'll experience a feeling . . . a feeling of being
 ready to do something . . . it really doesn't matter . . . perhaps just a feeling of being ready to be
 even more surprised . . . it doesn't really matter . . . nothing really matters but your experience of
 comfort and relaxation . . . with nothing to bother and nothing to disturb . . . that's fine . . . and now,
 as you continue to enjoy your comfortable relaxation, I'd like you to notice how very nice it feels to
 be this way . . . to really enjoy your own experience, to really enjoy the feelings that your body
 can give you . . . and in a moment, but not yet . . . not until you're ready . . . in a moment, I'm going
 to count from 20 to 1 . . . and as you probably know, I'd like you to feel yourself going back along
 that pathway . . . one step for each number . . . you'll have all the time you need . . . after all, time is
 relative . . . feel yourself slowly and comfortably going back along the pathway, one step for each
 number I count . . . when I reach three, your eyes will be almost ready to open . . . when I reach
 two, they will have opened . . . and, when I reach one, you'll be alert, awake, refreshed . . . perhaps
 as though you had a nice nap . . . alert, refreshed, and comfortable . . . and even though you'll
 still be very comfortable and relaxed, you'll be alert and feeling very well . . . perhaps surprised, but
 feeling very well . . . and I don't want you to feel too comfortable and too relaxed if you need to do
 something like drive. Then you'll be very alert indeed! But for now, perhaps ready to be surprised
 . . . no hurry, you'll have all the time you need, as you begin to go back up the pathway . . .

TWENTY . . . NINETEEN . . . EIGHTEEN . . . that's right, feel yourself going back . . . ready to be surprised, knowing what you had for lunch yesterday, and yet . . . SEVENTEEN . . . SIXTEEN . . . FIFTEEN . . . a quarter of the way back now, more and more alert . . . no rush, plenty of time . . . feel yourself becoming more and more alert . . . FOURTEEN . . . THIRTEEN . . . TWELVE . . . ELEVEN . . . TEN . . . halfway back along the pathway . . . becoming more and more alert . . . comfortable, but more and more alert . . . NINE . . . that's right, feel yourself becoming more and more alert . . . EIGHT . . . SEVEN . . . SIX . . . FIVE . . . FOUR . . . THREE . . . that's right . . . TWO . . . and ONE . . . that's right, wide awake, alert, relaxed, refreshed . . . there, that's fine.

APPENDIX XV: Summary of Participant's, Dentist's, and Dental Assistant's Comments

Following are comments regarding the preparatory intervention and dental treatment supplied by participants, dental assistants, and dentists regarding the four preparatory groups.

Indirect Taped Hypnotherapy Group Participants' Comments About Experience

Participant #	Own Comments	Dentist's Comments	Dental Assistant's
#1	Great!	Seemed very relaxed	Very relaxed and pleasant
#4		Very relaxed and helpful	
#13		Never as relaxed as today	95% better than other appointments
#17		Overreacted to loud noises and movements	Very nervous
#20	Was a good time Not rushed	Relaxed compared to other appointments	
#23	Distracted by bell during tape	Some discomfort during injection (mandibular block)	
#28	Had a different state Like discoordination	Very relaxed and alert	Seemed relaxed
#32	Couldn't visualize		
#39	Good; music would be good too	Appointment went well	
#37			Thought he did well
#42		Uneventful	Didn't fidget as much as usual
#48		Seemed to go well, although some discomfort	
#51		Uneventful, calm and relaxed He normally isn't	
#52	Thought the room was relaxing	Went well, some apprehension to start but relaxed	
#55	Really enjoyed and felt relaxed	Went very well, norally nervous	Said he felt very relaxed
#57	Found relaxing my jaw helpful	Went very well considering History of delivering poor anesthesia in this area	
#66		Didn't seem to experience discomfort	
#70		Did well in all aspects Stated prior that thought self a "bad" patient	
#76	There was good rapport	Some discomfort	
#78	I really enjoyed it I think it's a really good idea		

Direct Live Hypnotherapy Group Participants' Comments About Experience

Participant #	Own Comments	Dentist's Comments	Dental Assistant's
#2		Nervous at some stages Interpreted movements as pain. More anesthetic needed	Very aware of noise
#10	My mind wandered Didn't feel you were with me	Seemed fairly relaxed	A wee bit uptight
#14		Trouble with anesthesia But more relaxed than previously	Hard to freeze
#19		Had to wait for anesthetic otherwise comfortable	
#29		No discomfort	Was comfortable
#34		Experienced pain during anesthetic	
#35		Appointment went well	
#40	Worked out really well Concentrated on relaxing Gave me something to think about	Some discomfort when clamp was placed	
#49	I don't really need it	Some discomfort with drilling Normally very anxious	
#50		Went very well	
#58	Very good	Very smooth appointment Very relaxed	
#62	Every time I was told to relax I felt a little knot like I was being forced	Appointment went very well	
#63	Too time consuming	Some discomfort with injection and drilling	
#71		Tolerated well Some slight discomfort	
#81		Some discomfort with injection, otherwise went well	
#87	Suggestion was good More interaction would be good	Some discomfort with injection	
#92	I was surprised I actually felt some of the suggestions	Some discomfort Tense, but not so much as in previous appointments	
#94		Some pain with injection Rubber dam caused some discomfort	Didn't appear in pain
#95		No signs of discomfort	
#99		Went very well Very relaxed	

Indirect Live Hypnotherapy Group Participants' Comments About Experience

Participant #	Own Comments	Dentist's Comments	Dental Assistant's
#3	I was quite comfortable	Very relaxed and helpful	Appointment went very smoothly
#6		Appointment went smoothly Normally nervous but not this time	Very relaxed
#15		Needed more anesthetic somewhat nervous and tense	Extremely hyper and tense
#21		By far the most relaxed she has been with us	
#22	Definitely thought was great. Never knew I could relax so much	Did exceptionally well Is usually apprehensive	
#25	I seemed to hold back during the hypnosis	Seemed quite comfortable	
#26		Flinched during injection Otherwise went well	Talked alot
#31		A+	
#43		Did not seem to experience pain	
#54	I thought it really helped. More relaxed than ever	Experienced pain during mandibular block injection-	
#60	Very relaxed My hands didn't even sweat this time	Tolerated well, slight sensitivity at one point	
#64	Surprising that the technique works	Nervous, some discomfort	
#65		Pain with drilling	
#69	Could probably read a book and get as much	Normally nervous but did well	More worried about the nature of work
#72	Really surprised I could be hypnotized I couldn't before	Slight pain during anesthetic otherwise went well	
#83		Did very well	
#85	I wouldn't be against having it again	Tolerated all treatment well	
#93		All treatment went well Slight discomfort during palliative injection	
#96	It worked! It relaxed me!	No obvious discomfort	
#98		Pain during injection Otherwise went well	

Direct Taped Hypnotherapy Group Participants' Comments About Experience

Participant #	Own Comments	Dentist's Comments	Dental Assistant's
#7			Hyper before Calmed down
#8		Difficult patient but severe decay	Very, very hyper and in much pain
#16	Dentist could have touched shoulder more often	Some discomfort initially, otherwise relaxed	Very relaxed
#18	Couldn't stay with it		
#24			Quite relaxed
#38	Waste of time	Discomfort with the injection	
#45		No pain or discomfort	Very good
#46	Didn't need it		
#47	Sounded like the sea behind	Some discomfort during drilling	
#56		Quite relaxed	
#61		Some pain and discomfort	
#67	Seemed to slow and go		Patient very relaxed
#68	Felt it helped alot	Reacts to noises	Very comfortable through procedure
#73	Felt relaxed	More relaxed than usual	
#74		Tolerated all treatment well	
#77	I'm really surprised your technique works		Patient seemed relaxed
#79		Discomfort during injection and drilling	
#86		Some discomfort during drilling	
#89		Some pain with injection	
#90	It was like a student assignment	Didn't show much discomfort	

Control Group Participants' Comments About Experience

Participant #	Dental Assistant,s Comments	Dentist's Comments
#5		Very easy patient to work on
#9		Somewhat uncomfortable during drilling
#11		Still some anxiety as she is a very nervous patient
#12	Was very claustrophobic and conscious of time	Quite sensitive on one occasion
#27		Seemed quite relaxed
#30		Seemed very relaxed
#33		Couldn't complete treatment
#36		Experienced moderate pain
#41		Experienced pain during this appointment
#44		Pain during injection and drilling
#53		Somewhat tense at times. Pain and discomfort during drilling.
#59		Some discomfort when placing band on tooth.
#75		
#80		Very nervous to begin with
#82		Tolerated treatment well
#83		Slight discomfort during clamp placement.
#88		Some discomfort during injection.
#91		Discomfort during drilling
#97		Discomfort with injection
#100		Did well otherwise
		Discomfort during injection. Otherwise relaxed